Service Manual

Compact Disc Player

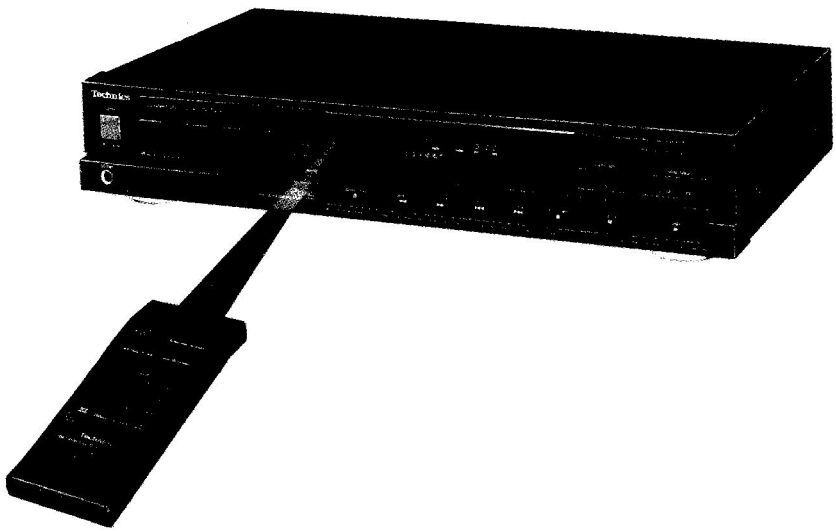
COMPACT disc DIGITAL AUDIO

DIGITAL

SL-P230

Color

(K)...Black Type
(S)...Silver Type



Area

Color	Area
(K)	(M).....U.S.A.
(K)	(MC).....Canada.
(K) (S)	(E).....Continental Europe.
(K) (S)	(EK).....United Kingdom.
(K) (S)	(XL).....Australia.
(K) (S)	(EG).....F.R. Germany.
(K) (S)	(EB).....Belgium.
(K) (S)	(EH).....Holland.
(K) (S)	(EF).....France.
(K) (S)	(Ei).....Italy.
(K)	(XA).....Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	(XB).....Saudi Arabia.
(K)	(PA).....Far East PX.
(K)	(PE).....European Military.
(K)	(PC).....European Audio Club.

Please use this manual together with the service manual for Model No. SL-P250, Order No. HAD8803055C0.

Notes: ★ Mentioned in this service manual is the differences from Model No. SL-P250 for each area.
★ Please note the following major defference when servicing.
• This product is not provided with the numeric switches on the operation P.C.B.

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CHANGES

■ REPLACEMENT PARTS LIST

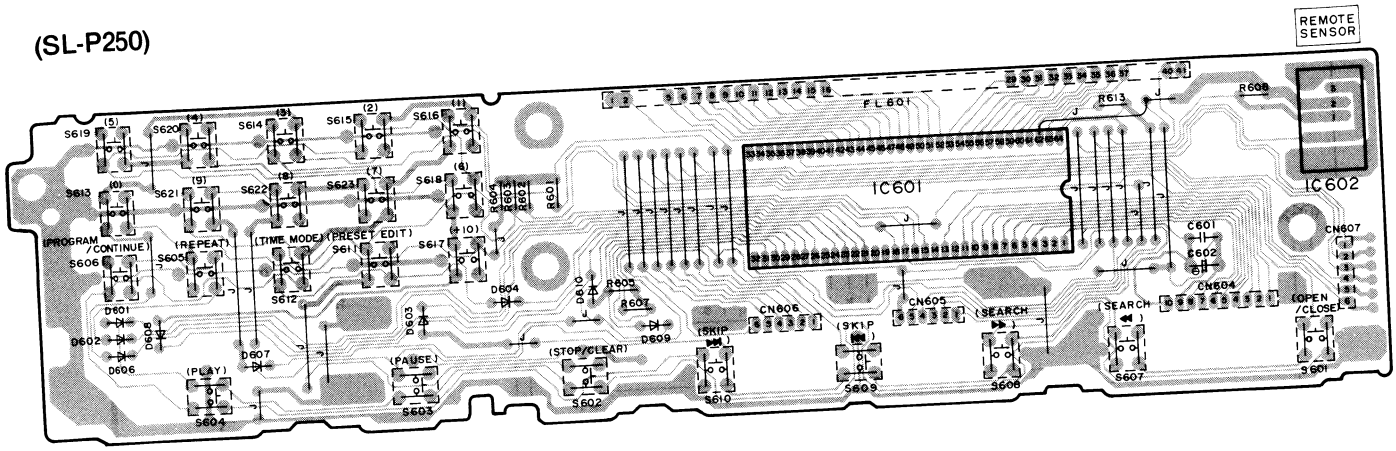
Notes: ★ Mentioned in this parts list are only those parts different from Model No. SL-P250 for each destination, other parts are the same as for Model No. SL-P250 for each destination.
★ "Ⓢ" mark parts are used for silver type only.
★ "Ⓚ" mark parts are used for black type only.
★ Parts other than "Ⓢ" and "Ⓚ" marked are used for both silver and black types.

Ref. No.	Change of Part No. SL-P250 → SL-P230		Part Name & Description	Remarks
SWITCHES				
S613~S623	EVQQS405K	——	Switch, Numeric	Deletion
CABINET AND CHASSIS				
9 [E]	SGPLP250-KE	**SGPLP230-KE**	Chassis	Change
9 [EB, EH, EF, Ei]	SGPLP250-KEB	**SGPLP230-KEB**	Chassis	Change
9 [EG]	SGPLP250-KEG	**SGPLP230-KEG**	Chassis	Change
9 [EK]	SGPLP250-KEK	**SGPLP230-KEK**	Chassis	Change
9 [M, MC]	SGPLP250-KM	**SGPLP230-KM**	Chassis	Change
9 [PA, PE, PC]	SGPLP250-KPA	**SGPLP230-KPA**	Chassis	Change
9 [XA]	SGPLP250-KXA	**SGPLP230-KXA**	Chassis	Change
9 [XB]	SGPLP250-KXB	**SGPLP230-KXB**	Chassis	Change
9 [XL]	SGPLP250-KXL	**SGPLP230-KXL**	Chassis	Change
10 Ⓚ	SGYLP250-KM	**SGYLP230-KM**	Front Panel	Change
10 Ⓢ	SGYLP250-SE	**SGYLP230-SE**	Front Panel	Change
14 Ⓚ	SBCD5090ZK0A	**SBCD5070ZK0B**	Button, Time Mode	Change
14 Ⓢ	SBCD5090MA0A	**SBCD5070MA0B**	Button, Time Mode	Change
15 Ⓚ	SBCD5100ZK0A	**SBCD5070ZK0A**	Button, Program	Change
15 Ⓢ	SBCD5100MA0A	**SBCD5070MA0A**	Button, Program	Change
16 Ⓚ	SBCD5100ZK0B	**SGXD3320ZK0A**	Button, Ornament	Change
16 Ⓢ	SBCD5100MA0B	**SGXD3320MA0A**	Button, Ornament	Change
PACKING				
P1 Ⓚ [M, E, EG, EB, EH, Ei, EK, XL, XA, XB, PA, PE, PC]	SPND290	**SPND287**	Carton Box	Change
P1 [MC] Ⓚ	SPND291	**SPND288**	Carton Box	Change
P1 [EF] Ⓚ	SPND292	**SPND289**	Carton Box	Change
P1 Ⓢ [E, EG, EB, EH, Ei, EK, XL, XB, XA]	SPND303	**SPND301**	Carton Box	Change
P1 [EF] Ⓢ	SPND304	**SPND302**	Carton Box	Change
ACCESSORIES				
A1 [E, EB, EH]	SQXLP250-KE	**SQXLP230-KE**	Instruction Manual	Change
A1 [MC]	SQXLP250-KMC	**SQXLP230-KMC**	Instruction Manual	Change
A1 [PA, PE, PC]	SQXLP250-KPA	**SQXLP230-KPA**	Instruction Manual	Change
A1 [XB]	SQXLP250-KXB	**SQXLP230-KXB**	Instruction Manual	Change
A1 [M]	SQX54598	**SQX54591**	Instruction Manual	Change
A1 [XL, XA, EF]	SQX54600	**SQX54593**	Instruction Manual	Change
A1 [EK]	SQX54602	**SQX54595**	Instruction Manual	Change
A1 [EG]	SQX54603	**SQX54596**	Instruction Manual	Change
A1 [Ei]	SQX54604	**SQX54597**	Instruction Manual	Change

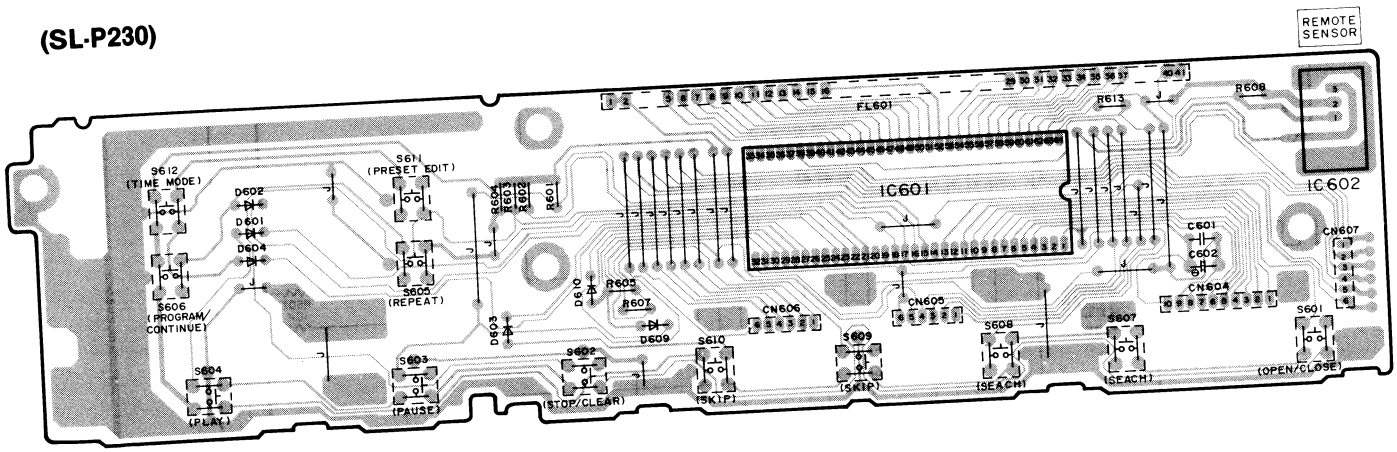
■ PRINTED CIRCUIT BOARD

A OPERATION P.C.B.

(SL-P250)



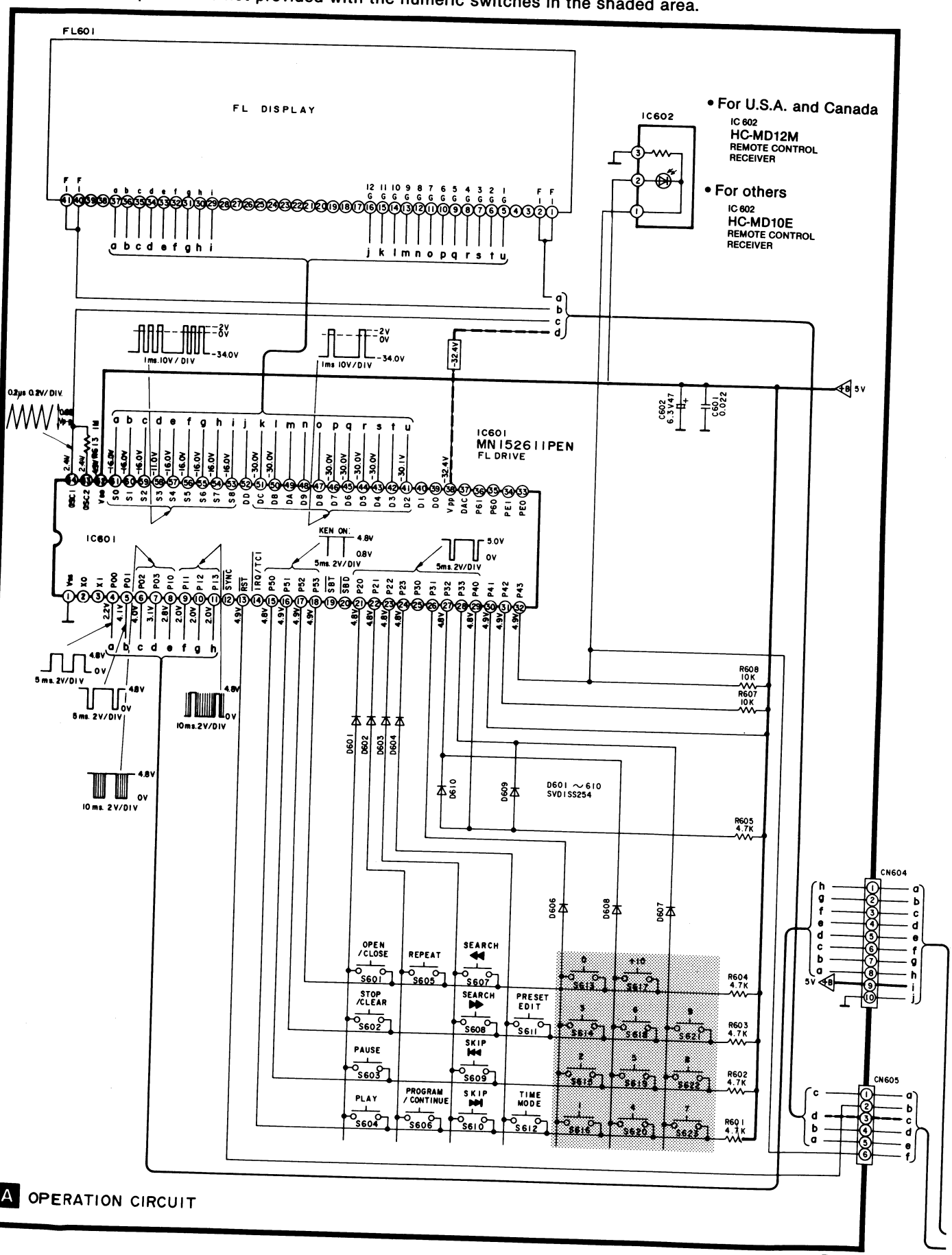
(SL-P230)



■ SCHEMATIC DIAGRAM

• OPERATION CIRCUIT

Note: This product is not provided with the numeric switches in the shaded area.



A OPERATION CIRCUIT

Printed in Japan
H880308600AM

ORDER NO. HAD8803055C0
A6

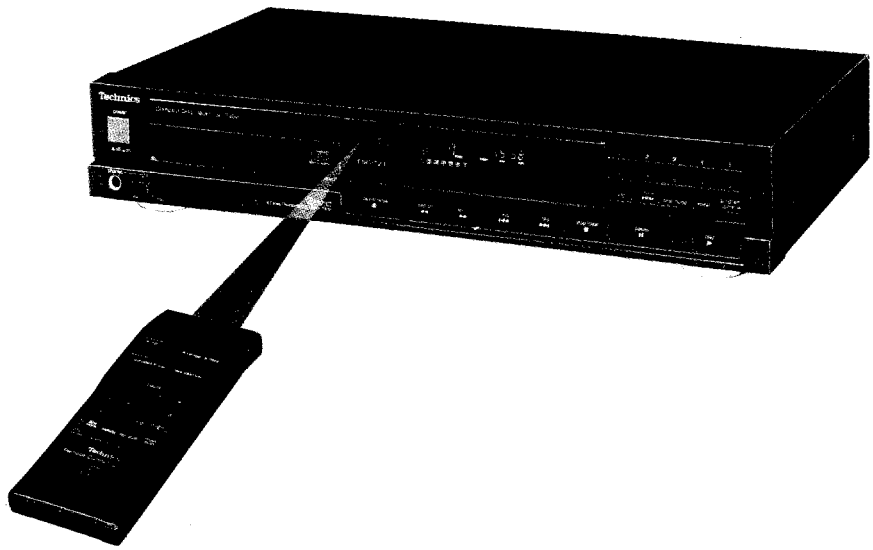
Service Manual

COMPACT disc DIGITAL AUDIO

DIGITAL

Compact Disc Player

SL-P250



Color	Areas
(K)	(M).....U.S.A.
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(K) (S)	(E).....Continental Europe.
(K) (S)	(EK).....United Kingdom.
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(K)	(XB).....Saudi Arabia.
(K)	(PA).....Far East PX.
(K)	(PE).....European Military.
(K)	(PC).....European Audio Club.

Color

(K)...Black Type
(S)...Silver Type

SPECIFICATIONS

■ Audio

No. of channels	2 (left and right stereo)
Frequency response	2~20,000Hz±0.5dB
Output voltage	2V (at 0dB)
Dynamic range	94dB
S/N ratio	96dB
Harmonic distortion	0.003% (1kHz, 0dB)
Total harmonic distortion	0.006% (1kHz, 0dB)
Wow and flutter	Below measurable limit
Output impedance	Approx. 600Ω
Load impedance	More than 10kΩ
Headphone output level	15mW max. 32Ω (adjustable)
D-A conversion system	2 DAC System with 16-bit Resolution

■ Signal Format

Sampling frequency	44.1kHz
D-A conversion	16-bit linear

■ Pickup

Wavelength	780nm

■ Infrared remote-control transmitter

Dimensions (W×H×D)	61×19×165mm (2-13/32" × 3/4" × 6-1/2")
Batteries	UM-4 "AAA" batteries or IEC R03 or equivalent (1.5V×2)
Weight	105g (3.7 oz.) (including batteries)

■ General

Power supply	For U.S.A. and Canada.: AC120V, 60Hz For United Kingdom and Australia: AC240V, 50Hz For Continental Europe: AC220V, 50Hz For Others: AC 110V/127V/220V/240V, 50/60Hz
Power consumption	For U.S.A. and Canada: 13W For Others: 11W
Dimensions (W×H×D)	430×79.8×247mm (16-15/16" × 3-5/32" × 9-23/32")
Weight	3.1kg (6.8 lb.)

Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

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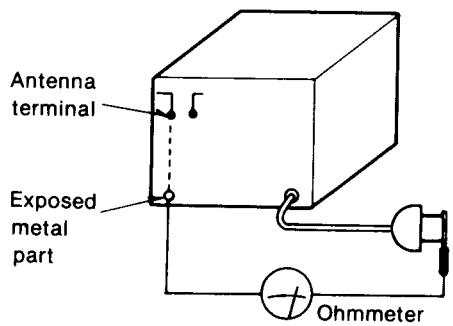
■ SAFETY PRECAUTION (This "safety precautions" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

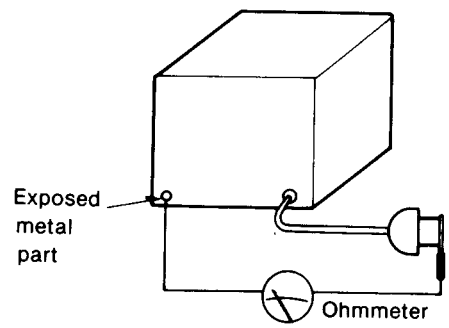
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



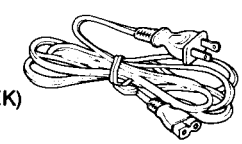
(Fig. B)

Resistance = Approx ∞

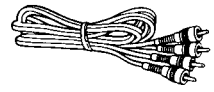
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ ACCESSORIES

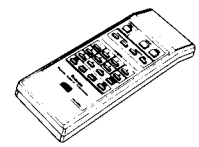
- AC power supply cord 1
  - SJA175-1 (M)
  - SJA172 (MC)
  - SJA187 (E, EB, EH, EG, EF, EI)
  - SJA173 (XL)
  - SFDAC05G02 (EK)
  - SJA168 (XA, PA, PE, PC)
  - SJA183 (XB)



- Stereo connection cable 1 (SJP2249-1)

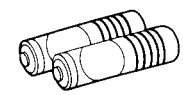


- Remote-control transmitter 1



EUR64786 (M, MC)
EUR64787 (others) ..... Black version
EUR64792 (others) ..... Silver version

- Batteries 2
  - UM-4NEP (M, MC)
  - UM-4NE (others)



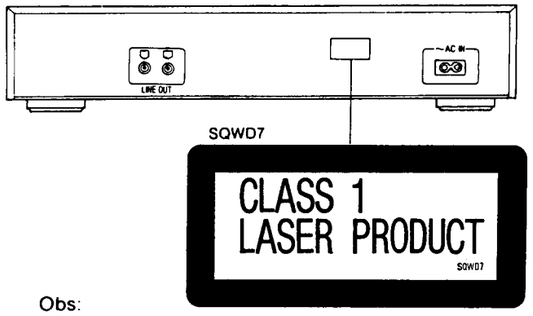
D

■ PRECAUTION OF LASER DIODE

Caution: This product utilizes a laser diode.
ADVARSEL: I dette a apparat anvendes laser.

- **Use of caution labels** Note ○ Mark is used, × Mark is not used

Areas	SQWD45	SQWD10	SQWD7	SQWD19
[MC]	×	○	×	×
[E]	○	×	○	○
[EK], [XL], [EG], [EB], [EH], [EF], [Ei], [XA], [XB]	○	×	○	○



Obs:
Apparaten innehåller laser
Komponent av höger laserklass
än klass 1.

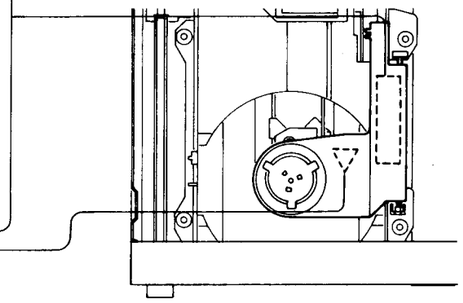
SQWD45

ADVARSEL - Usynligt laserlys udstråles ved åbning.UNDGÅ DIREKTE BESTRÅLING.

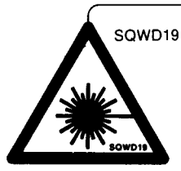
DANGER-Invisible laser radiation when open. AVOID DIRECT EX-POSURE TO BEAM.
SQWD45

SQWD10

"CAUTION-HAZARDOUS LASER, AND ELECTROMAGNETIC RADIATION WHEN OPEN"
"ATTENTION-RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT"
SQWD10



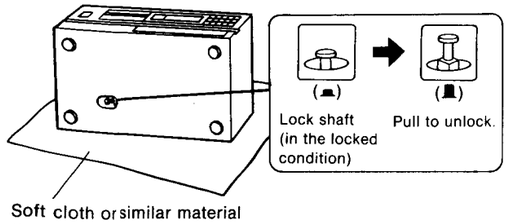
SQWD19



VAROITUS! Laite sisältää laserdiodin,
joka lähettää näkymätöntä silmille
vaarallista lasersäteilya

■ BEFORE USING THIS UNIT

The optical pickup is secured to prevent damage during transport. Be sure to release it before use.

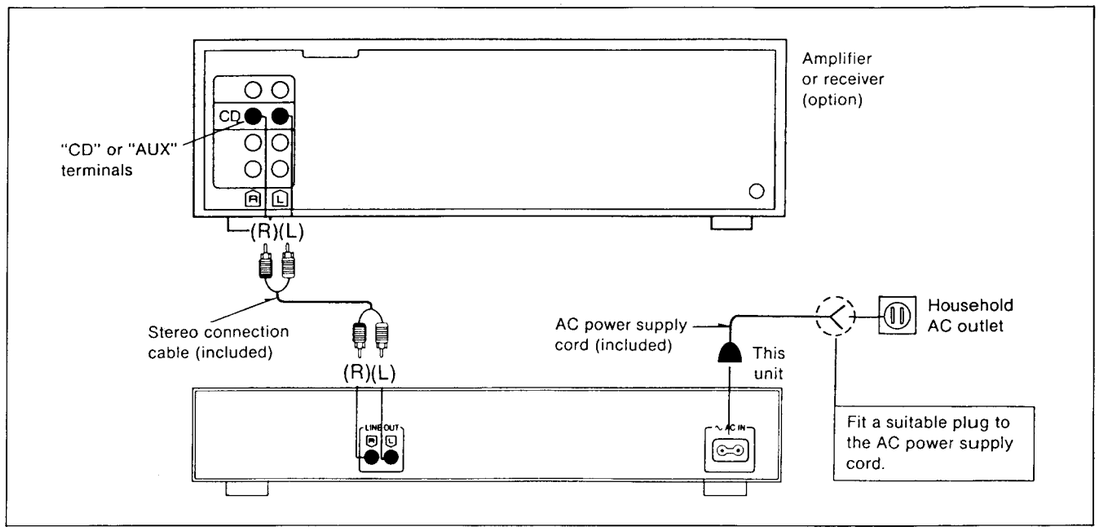


Caution:
Do not transport the unit without locking the lock shaft.
Severe damage will result.

If the unit is transported again, perform the following steps:
1) Remove the disc from the tray and turn off the power.
2) Place the unit with the rear panel facing downward.
3) Push the lock shaft to the in (LOCK) position (🔓→🔒).

- **Place on a flat, level surface so that the front-rear inclination does not exceed 5°.**
- **Avoid places such as the following:**
- Near any equipment or device that generates strong magnetism.
- On any heat-generating equipment or device, or in any place where the temperature is high (40°C or higher).
- Extremely cold places (5°C or below).
- Near a tuner or TV
  (It may cause noise in the broadcast, or disturbance of the TV picture.)
- For long periods of time in direct sunlight.
- In dusty or smoky locations.
- In locations prone to vibrations.
- In locations where the rear panel is less than 10 cm (about 4") away from the wall or back of an audio rack.
- Within reach of children.
- **Do not place heavy objects, other than system components, on top of the unit.**
- **When carrying or storing the unit, handle it with care so it is not subjected to any strong bumps.**
  Always remove the disc before storing the unit for any period of time.
- **To avoid problems due to vibration.**
- Do not place a book or similar object under this unit.
- Do not route the connection cables (of this or other units) across the operation panel, across the top, or under the unit.

■ CONNECTIONS



■ CONCERNING COMPACT DISCS

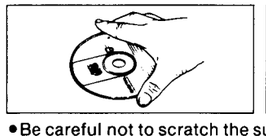
Handling precautions

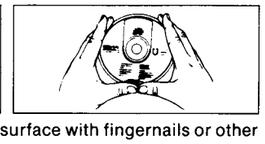
Only compact discs having this mark can be used with this unit.

COMPACT disc DIGITAL AUDIO

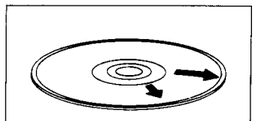
Observe the following precautions to enjoy the same outstanding sonic performance from your Compact Discs for many years.

- Hold compact discs by the edges so the surface is not soiled with fingerprints.

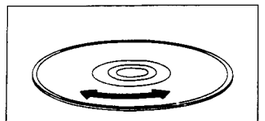




- Be careful not to scratch the surface with fingernails or other sharp objects, particularly when inserting and removing discs from their cases.
- Do not bend the disc.
- Do not use record cleaning sprays or static electricity prevention liquids.
- Do not wipe with benzine, thinner or any other solvent. If the surface is soiled, wipe gently with a soft, damp (water only) cloth.
- When wiping discs, always move the cloth directly outward from the center of the disc, not in a circular motion as with standard phonograph records.



(Correct)



(Incorrect)

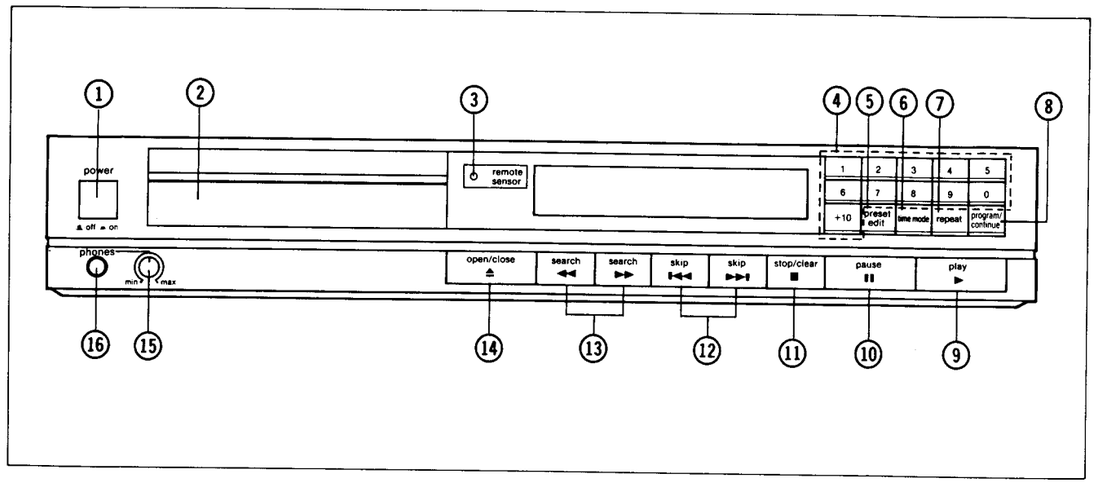
(In compact discs, circular scratches along a line of pits are more likely to cause errors than straight scratches across many lines of pits.)

- If the disc is brought from a cold environment into a warm room, moisture may form on the disc. Wipe this off with a soft, dry, lint-free cloth before using the disc.
- Do not dry discs with a hair dryer.
- Do not write on the label side with a ball-point pen, hard pencil or other writing utensil.
- Handle compact discs with care. Fingerprints, dirt and scratches can cause skipping and distortion.

Storage precautions

- Be sure to store discs in their cases to protect them from dust, scratches and warping.
- Do not place or store discs in the following places:
  1) Locations exposed to direct sunlight.
  2) Humid or dusty locations.
  3) Locations directly exposed to a heat outlet or heating appliance.
  4) In the glove compartment or rear ledge of an automobile.

■ FRONT PANEL CONTROLS AND FUNCTIONS



Control section

① Power switch (power)

② Disc tray

③ Remote-control signal receptor (remote sensor)

④ Numeric buttons (1~0, +10)
These buttons can be used to select the track numbers and the recording time.

⑤ Preset edit play button (preset edit)
This button can be used to specify the playing time.

⑥ Time-mode select button (time mode)

⑦ Repeat button (repeat)

⑧ Programmed/continue button (program/continue)

⑨ Play button (play ►)

⑩ Pause button (pause ▮▮)

Pause mode:
Play is stopped, but the pickup remains where it was at the time when the pause button was pressed. The disc rotates while the unit is in the pause mode.

⑪ Stop/clear button (stop/clear ■)
This button can be used to stop the disc play, as well as to cancel the various play modes.

Stop mode:
In the stop mode, the pickup is at the beginning of the first track and the display shows the total number of tracks and total playing time of the disc. (The disc does not rotate.)

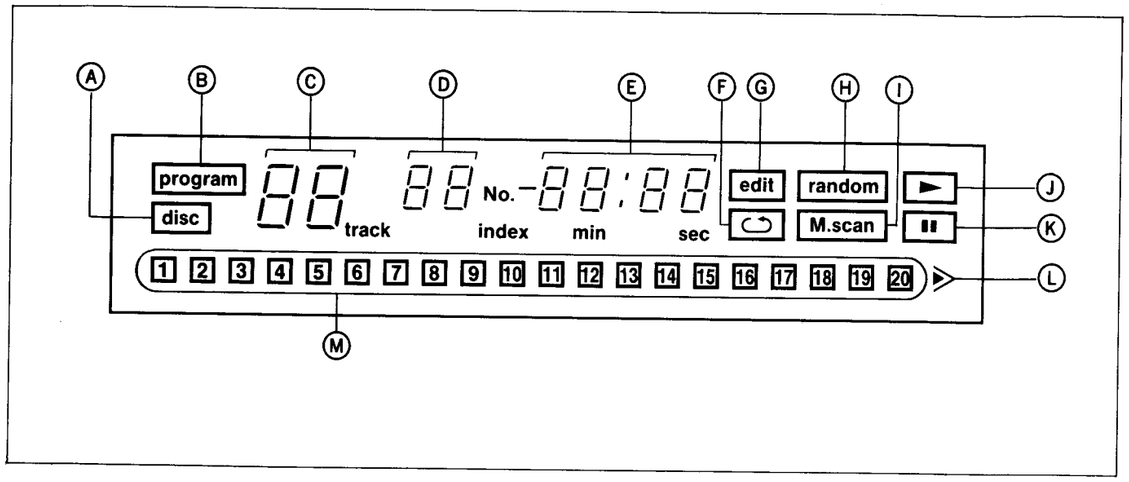
⑫ Skip buttons (▮◄◄ skip/skip ►►▮)

⑬ Search buttons (◄◄ search/search ►►)
These buttons can be used to locate a desired part of the disc at high speed (forward or backward) during disc play. (The search speed is slow when the button is first pressed, and becomes faster if the button is pressed and held continuously.)

⑭ Open/close button (open/close ≙)

⑮ Headphones volume control

⑯ Headphones jack (phones)



Indicators section

Ⓐ Disc indicator (disc)
This indicator illuminates when a disc is loaded.

Ⓑ Programmed-play indicator (program)

Ⓒ Track number display (track)

Ⓓ Index-number display (No./index)
This display shows the index number as well as the sequence of programmed play.

Ⓔ Time display (min/sec)

Ⓕ Repeat indicator (⟲)

Ⓖ Preset edit indicator (edit)

Ⓗ Random-play indicator (random)

Ⓘ Music scan indicator (M.scan)

Ⓙ Play indicator (►)

Ⓚ Pause indicator (▮▮)

Ⓛ Over mark (≫)
The "≫" indicator illuminates if the total number of tracks on the disc is 21 tracks or more.
When the play reaches the 21st track and thereafter, the "≫" begins flashing.

Ⓜ Music matrix (1 ~ 20)
The numbers of the tracks on the disc are displayed up to a maximum of 20.

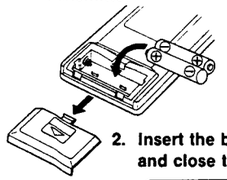
■ REMOTE-CONTROL TRANSMITTER

[Black version: EUR64786...[M] and [MC] areas
EUR64787...Other areas
Silver version: EUR64792...Other areas]

Insertion of remote-control transmitter batteries

1. Open the cover.

Bottom panel of remote-control transmitter



2. Insert the batteries and close the cover.

Use two UM-4 "AAA" (R03) size (1.5V) batteries.

■ To remove the batteries

Reverse procedure above.

■ Battery life About 1 year.

(Depending on frequency of use.)

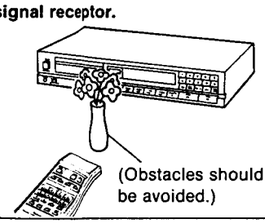
■ Notes concerning use of dry batteries

- Do not use re-chargeable batteries (Ni-Cd type).
- Be sure the batteries are inserted so that the positive (+) and negative (−) polarities are correct. Batteries installed with incorrect polarities may leak and damage the remote-control transmitter.
- Never subject the batteries to excessive heat or flame; do not attempt to disassemble them; and be sure they are not short-circuited.
- If the remote-control transmitter is not to be used for a long time, remove the batteries and store them in a cool dark place.
- Always remove old, weak or worn-out batteries promptly and dispose of them.
- Never mix old and new batteries, nor batteries of different types (carbon or alkaline).
- Although battery life varies depending on how often the remote-control transmitter is used, the batteries should be replaced about once every year on the average.
- The batteries should also be replaced if commands from the remote-control transmitter are not received by this player even when the transmitter is held close to the player's front panel.
- If the batteries leak, clean the battery holder well before inserting new batteries.
- Do not use remote-control transmitter for TV sets, VCRs or other components at the same time as this player's remote-control transmitter since this would result in a mistaken operation.

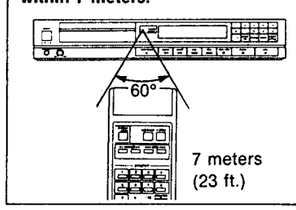
Operation notes

Note that operation may not be correct if direct sunlight or other strong light strikes the remote-control signal receptor part of this unit. If there is a problem, place the unit away from the direct sunlight or other strong light source.

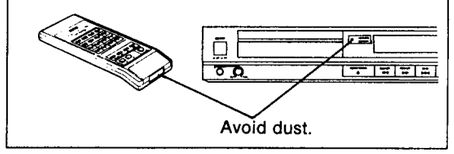
Face it toward the remote-control signal receptor.



Use the remote-control transmitter within 7 meters.

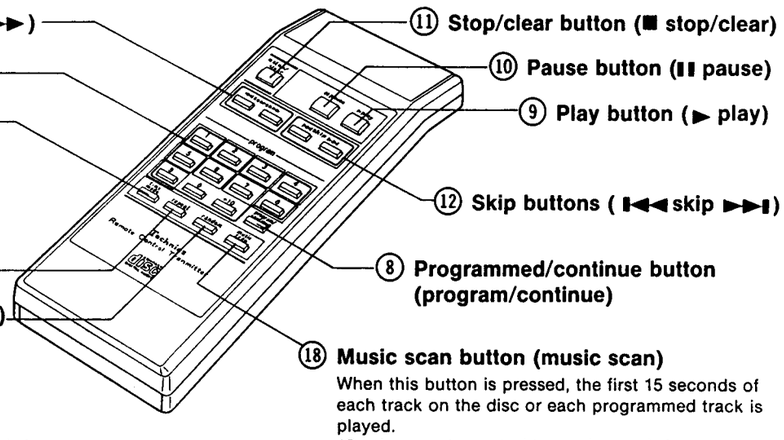


Be sure the transmitter part of the remote-control transmitter and the receptor part of this unit are free from dust. Excessive dust might prevent reception.



Note: The control panel of the remote-control transmitter may be covered by a clear plastic protective sheet. This sheet may be removed if desired.

Remote functions



⑬ **Search buttons (◀◀ search ▶▶)**

④ **Numeric buttons (1~0, +10)**

⑥ **Time-mode select button (time mode)**

⑦ **Repeat button (repeat)**

⑰ **Random-play button (random)**
This button can be used to select "random" play (the unit's microcomputer selects the sequence of track play in a random order).
(On the remote-control transmitter only.)

⑪ **Stop/clear button (■ stop/clear)**

⑩ **Pause button (❚❚ pause)**

⑨ **Play button (▶ play)**

⑫ **Skip buttons (❙◀◀ skip ▶▶❙)**

⑧ **Programmed/continue button (program/continue)**

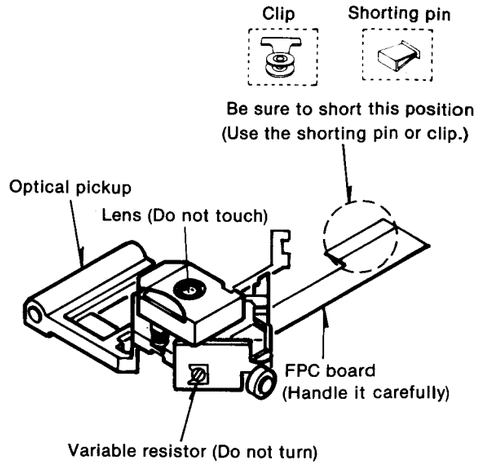
⑱ **Music scan button (music scan)**
When this button is pressed, the first 15 seconds of each track on the disc or each programmed track is played.
(On the remote-control transmitter only.)

■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the optical pickup may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the optical pickup.

• Handling of optical pickup

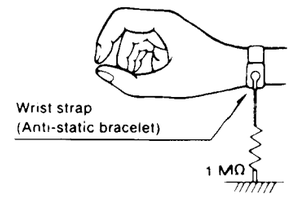
1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board. **(FPC board)**
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board. **(FPC board)**
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

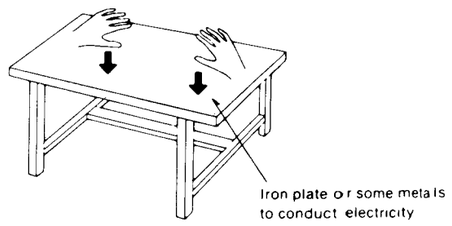


• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to relieve the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the optical pickup.



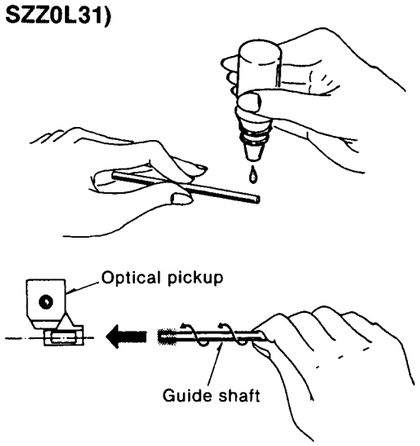


■ INSTRUCTIONS FOR THE OIL (Part No. SZZ0L31)

The container contains 6g (approx. 3ml) of oil. Since one application (one shaft) uses 0.05ml of oil.

How to Use

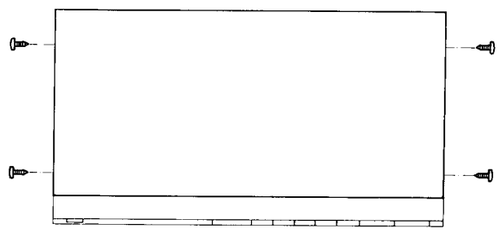
(1) Remove the guide shaft in the traverse deck from the optical pickup and clean off any dust from the guide shaft.
(2) Apply one drop of the SZZ0L31 to the tip of the guide shaft.
(3) Hold the guide shaft so that its oiled end touches the optical pickup and insert it into the bearing while rotating it slowly.
(4) After securing the guide shaft, move the optical pickup by hand several times to the left and right to distribute the oil on the guide shaft.



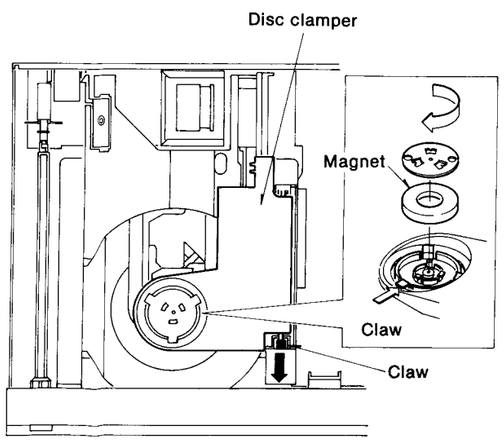
■ DISASSEMBLY INSTRUCTIONS

CAUTION:
- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When removing the cabinet and disc clamper of this unit, be sure to turn the power supply off.

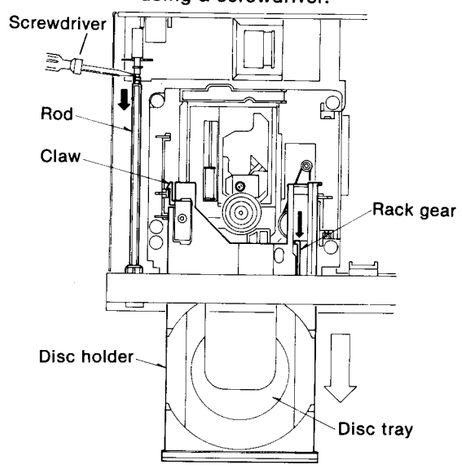
Ref. No. 1	How to remove the cabinet
Procedure 1	1. Remove the 4 screws.



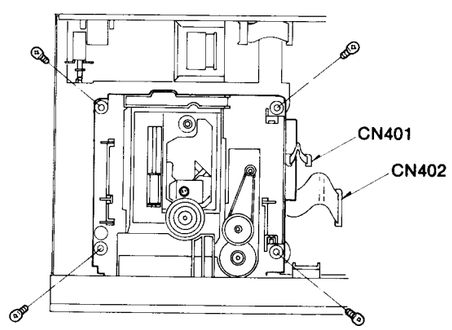
Ref. No. 2	How to remove the disc clamper and magnet
Procedure 1→2	**A. Disc clamper:** • Release the claw. • Lift clamper and pull in the direction of the arrow. **B. Magnet:** • Turn the holder in the direction of the arrow to release the claw.



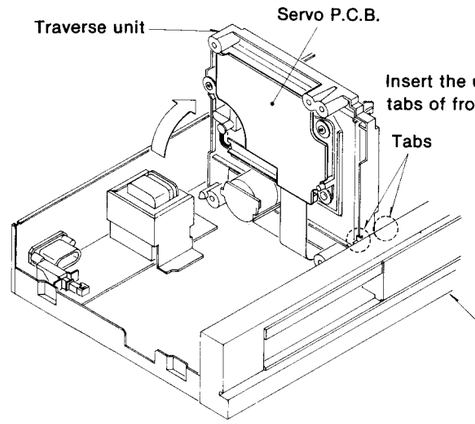
Ref. No. 3	How to remove the disc holder and power switch rod
Procedure 1→2→3	**A. Disc holder:** 1. Push the rack gear slowly in the direction of the arrow until the disc tray comes up. 2. Pull the disc holder until it stops. 3. Release the claw. 4. Pull out the disc holder further to remove it. **B. Power switch rod:** 1. Set the power switch in the "OFF" position. 2. Remove the power switch rod by using a screwdriver.



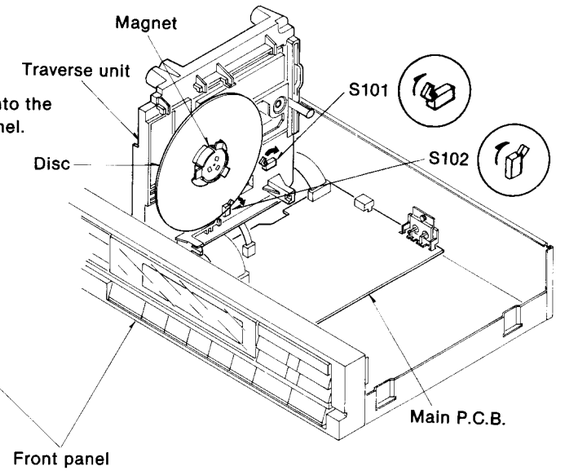
Ref. No. 4	How to remove the traverse unit
Procedure 1→2→3→4	• Remove the 4 screws.



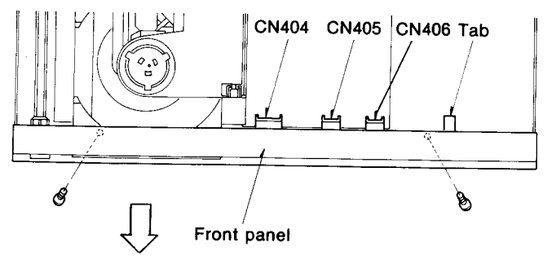
Ref. No. 5	How to check the servo P.C.B.
Procedure 1→2→3→4→5	• When checking the soldered surfaces of the servo P.C.B. and replacing the parts, do as shown.



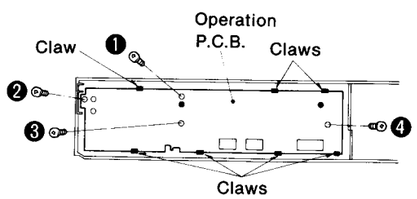
(To play a disc)
1. Place the test disc and magnet.
2. Turn "ON" the power switch of the player while holding the levers of the switches (S101, S102) in the direction of the arrow.

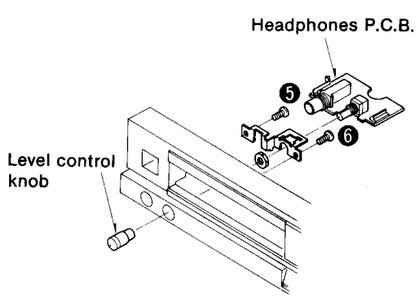


Ref. No. 6	How to remove the front panel
Procedure 1→6	• Remove the 2 screws. • Slightly pull out the tab and remove the front panel in the direction of the arrow.



Ref. No. 7	How to remove the operation P.C.B. and headphones amp. P.C.B.
Procedure 1→6→7	**A. Operation P.C.B.** 1. Remove the 4 screws (❶~❹). 2. Release the 7 claws. **B. Headphones amp. P.C.B.** 1. Pull out the level control knob. 2. Remove the 2 screws (❺, ❻).

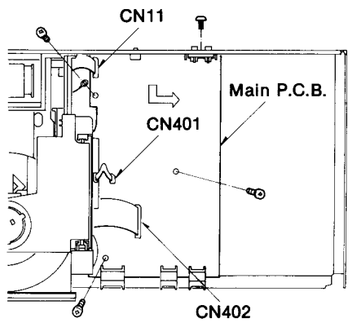




Ref. No. 8 — How to remove the main P.C.B.

Procedure 1→6→8

1. Remove the 4 screws.
2. Lift the P.C.B. remove it from the chassis tab.
3. Remove the P.C.B. in the direction of the arrow.

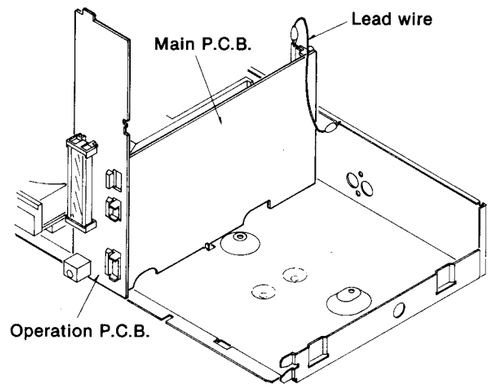


How to check the main P.C.B.

- When checking the soldered surface of the main P.C.B. and replacing the parts, do as shown.

Cautions:

- Be sure to connect the P.C.B. ground terminal (line out terminal) and the chassis with a lead wire.
- Be sure to connect the GND lead wire from the loading base to the chassis.



Ref. No. 9 — How to remove the servo P.C.B. and loading motor P.C.B.

Procedure 1→2→3→4→9

A. Servo P.C.B.

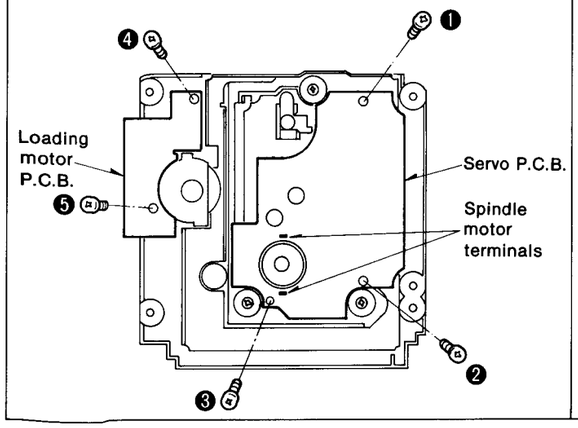
1. Remove the 3 screws (❶~❸).
2. Unsolder the 2 terminals of spindle motor.
3. Remove the FPC cord from the optical pickup.

Caution:

Be sure to short the FPC cord within 20 seconds after removal to prevent breakdown of the laser diode.

B. Loading motor P.C.B.

1. Remove the 2 screws (❹, ❺).

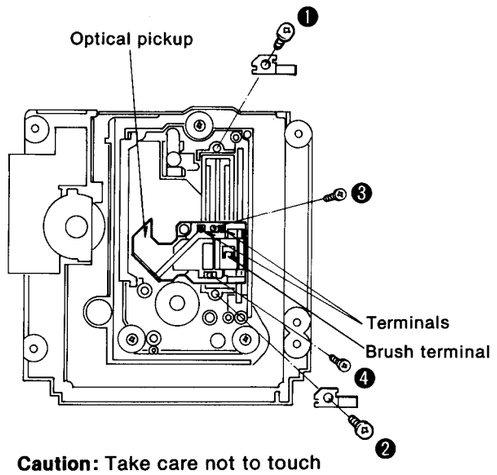


Ref. No. 10 — How to remove the optical pickup

Procedure 1→2→3→4→9→10

Refer to the optical pickup handling precautions and instructions for the oil (See page 6).

1. Remove the 2 screws (❶, ❷).
2. Unsolder the 2 terminals and the 2 screws (❸, ❹).

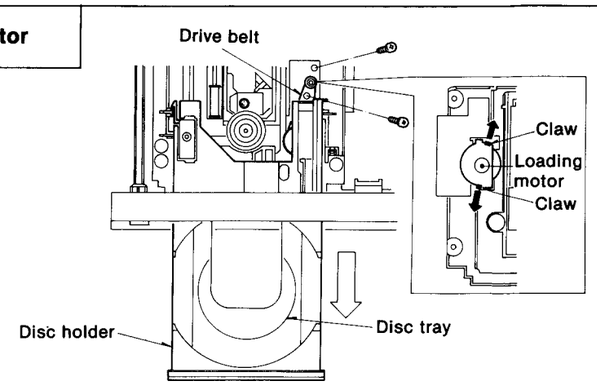


Caution: Take care not to touch the brush terminal.

Ref. No. 11 — How to remove the loading motor

Procedure 1→2→3→4→11

1. Remove the drive belt.
2. Remove the 2 screws.
3. Turn traverse unit over.
4. Release the claws.
5. Unsolder the terminals.



Ref. No. 12 — How to remove the spindle motor

Procedure 1→2→3→4→9→12

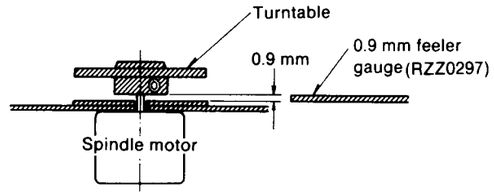
1. Loosen the screw (❶) by using a 1.27mm hexagonal wrench and remove the turntable.
2. Remove the 2 screws (❷, ❸).

Caution:

1. Turntable height adjustment is necessary any time the turntable or spindle motor is replaced.
2. The (+) terminal of the spindle motor is indicated by the red mark.

Adjustment of turntable height

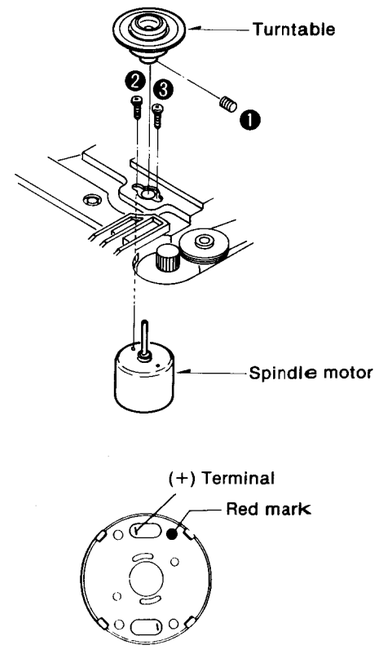
1. Insert a 0.9mm feeler gauge (RZZ0297) between the turntable and loading base as shown below.



2. Tighten the turntable set-screw by using a 1.27mm hexagonal wrench.

Caution:

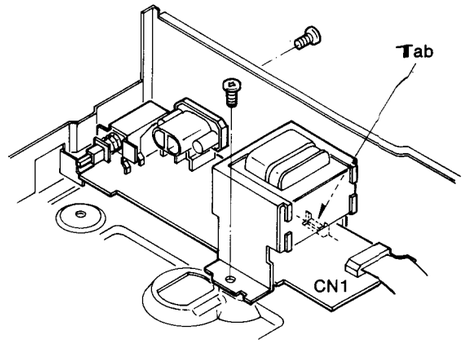
Refer to turntable height adjustment (see page 18).



Ref. No. 13 — How to remove the power transformer

Procedure 1→2→3→4→13

1. Remove the connector (CN1).
2. Remove the 2 screws.
3. Release the Tab.



D

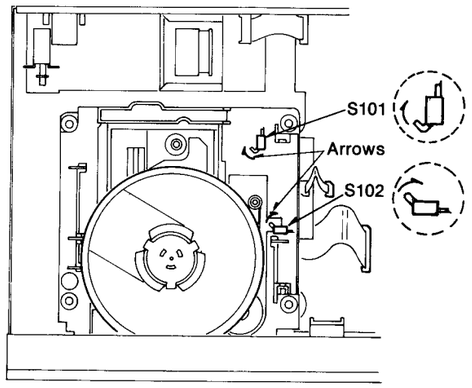
■ MEASUREMENTS AND ADJUSTMENTS

Caution:

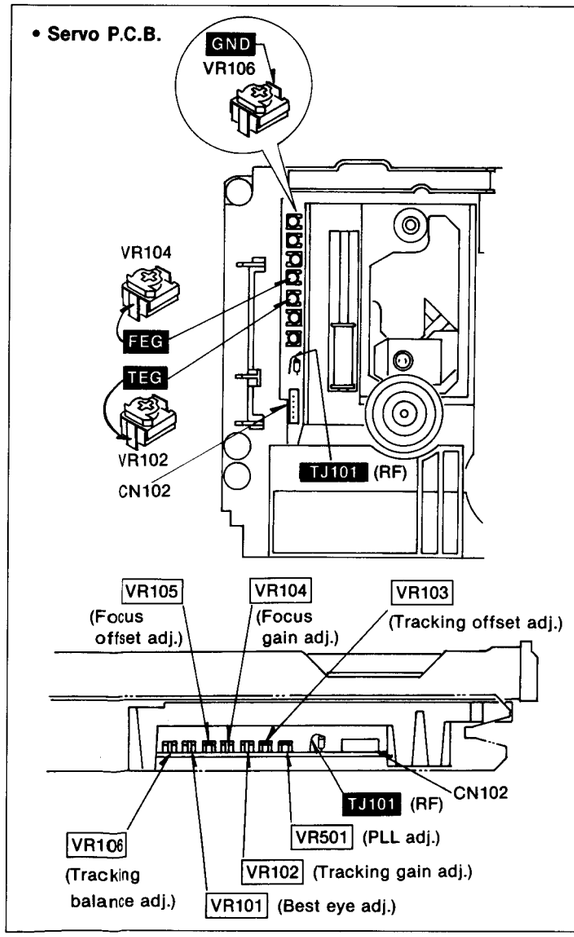
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
  With the unit turned "on", laser radiation is emitted from the pickup lens.
  Avoid exposure to the laser beam, especially when performing adjustments.

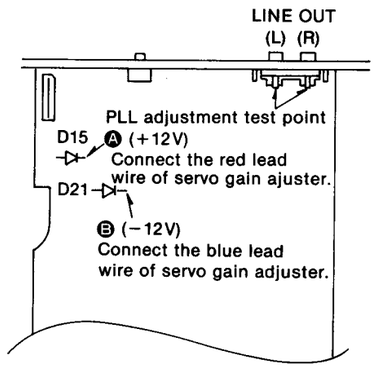
PREPARATION

1. Remove the cabinet. (Refer to page 9.)
2. Remove the disc clamper and magnet. (Refer to page 9.)
3. Remove the disc holder and power switch rod. (Refer to page 9.)
4. Place the test disc and magnet on the turntable.
5. Turn "ON" the power switch of the player, while holding the levers of the switches (S101, S102) in the direction of the arrow.
6. Release the levers of the switches (S101, S102) after the test disc starts rotating.



ADJUSTMENT POINTS





ELECTRICAL ADJUSTMENT

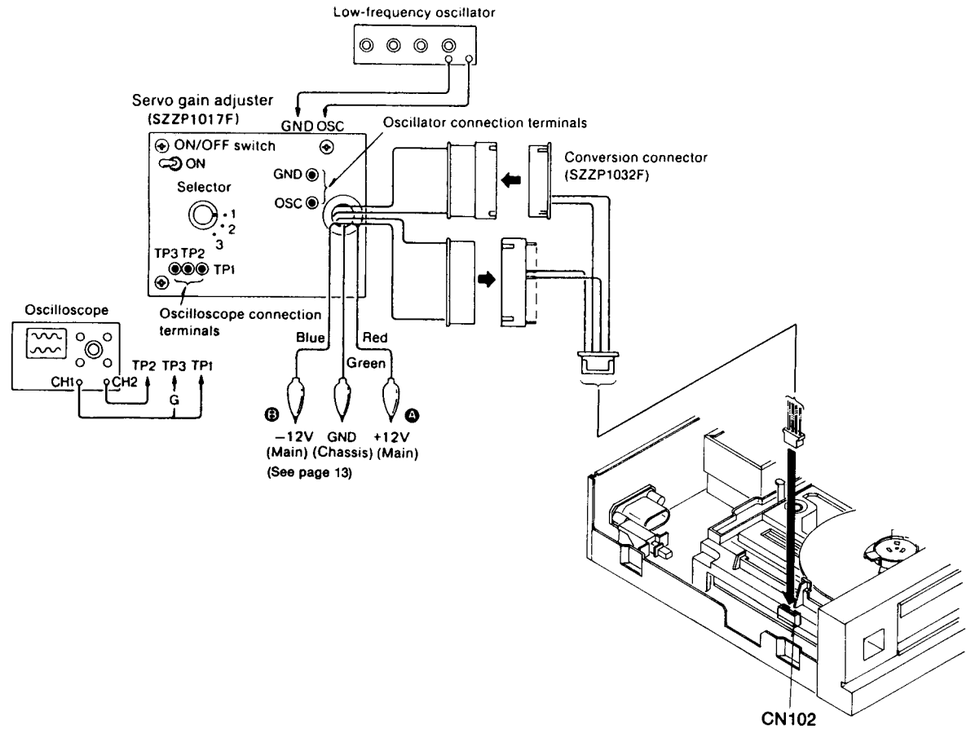
Measuring Instruments and Special Tools

- Servo gain adjuster (SZZP1017F)
- Test discs
  Test disc (SZZP1014F) old or new type
  Inspection test disc (SZZP1054C)
  Uneven disc (SZZP1056C)
  Black band disc (SZZP1057C)
- Ordinary disc
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Low frequency oscillator
- Conversion connector(SZZP1032F)

Adjustment Procedure

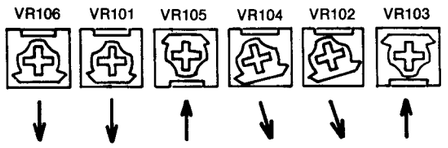
Step 1: Make the temporary setting of each VR . (Refer to page 15.)
↓
Step 2: Best eye (PD balance) adjustment. (Refer to page 15.)
↓
Step 3: Connect the servo gain adjuster. (Refer to page 14.)
↓
Step 4: Focus gain adjustment. (Refer to page 15.)
↓
Step 5: Tracking gain adjustment. (Refer to page 15.)
↓
Step 6: Focus offset adjustment (Refer to page 16.)
↓
Step 7: Tracking offset adjustment. (Refer to page 16.)
↓
Step 8: Tracking offset balance adjustment. (Refer to page 16.)
↓
Step 9: Disconnect the servo gain adjuster.
↓
Step 10: PLL adjustment. (Refer to page 17.)
↓
Step 11: Check of play operation after adjustment. (Refer to page 17.)

Connection of Servo Gain Adjuster



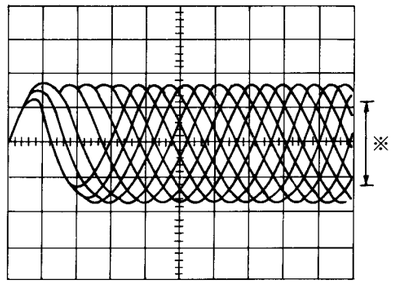
TEMPORARY SETTING OF EACH VR

Note :
If a disc skips or can not be played back, adjust each VR temporarily, as shown.



BEST EYE(PD BALANCE) ADJUSTMENT

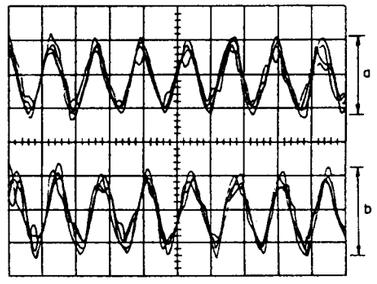
1.Connect CH1 of the oscilloscope to **TJ101** (+) and **GND** (-) of the servo P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5µsec.
INPUT.....AC
2.Set a test disc (SZZP1014F or SZZP1054C) and turn **ON** the power switch of the player. (Refer to page 13.)
3.Set the player to the play mode.
4.Adjust **VR101** so that the eye pattern of RF signal is stretched to maximum.
5.Turn **OFF** the power switch of the player.



※ Most stretched eye pattern.

FOCUS GAIN ADJUSTMENT

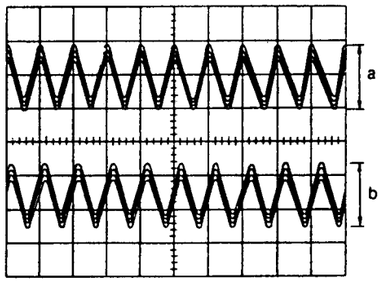
1.Connect the servo gain adjuster.(Refer to page 12.)
2.Set the selector switch of the servo gain adjuster to **2** and ON-OFF switch to **ON.**
3.Set the low frequency oscillator to a frequency of **825Hz** and an output voltage of **100mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
4.Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.(**TP3** is the ground terminal.)
Oscilloscope setting:VOLT.....100mV(both channels)
SWEEP.....1msec.
INPUT.....DC
5.Set a test disc (SZZP1014F or SZZP1054C) and turn **ON** the power switch of the player. (Refer to page 13.)
6.Set the player to the play mode.
7.Set the selector switch of the servo gain adjuster from **"2" to "3".**
8.**825Hz** signals will be displayed on the oscilloscope. Adjust **VR104** until the waveform amplitudes of both channels are equal.
9.Shift the selector switch of the servo gain adjuster from **"3" to "2".**



* Make a=b

TRACKING GAIN ADJUSTMENT

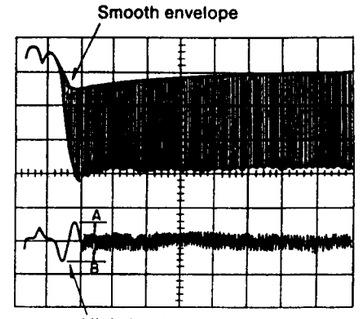
1.Oscilloscope setting and connections are the same as above.
2.Set the low frequency oscillator to a frequency of **1.0kHz** and an output voltage of **100mVp-p.**
3.Set the selector switch of the servo gain adjuster from **"2" to "1".**
4.**1.0kHz** signals will be displayed on the oscilloscope. Adjust **VR102** until the waveform amplitudes of both channels are equal.
5.Shift the selector switch of the servo gain adjuster from **"1" to "2".**



*Make a=b

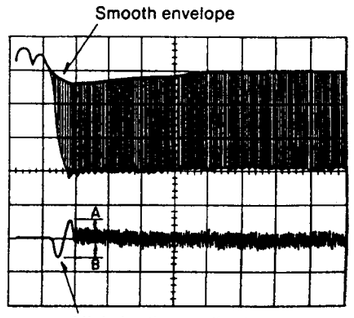
FOCUS OFFSET ADJUSTMENT

1.Connect CH1 of the oscilloscope to **TJ101** (+) and **GND** (-) of the servo P.C.B.
Connect CH2 of the oscilloscope to **FEG** (+) and **GND** (-) of the servo P.C.B.
Oscilloscope setting:VOLT.....200mV(CH1),
500mV(CH2)
SWEEP.....0.5msec.
INPUT.....AC(CH1),DC(CH2)
MODE.....NORM
(Triggering via CH1)
2.Set the test disc (SZZP1057C) and turn **ON** the power switch of the player. (Refer to page 13.)
3.Set the player to the play mode.
4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR105**, so that the waveform around the triggering point becomes as shown in the illustration.



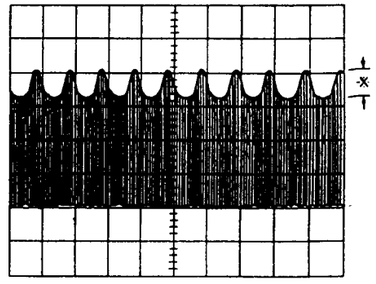
TRACKING OFFSET ADJUSTMENT

1.Connect CH1 of the oscilloscope to **TJ101** (+) and **GND** (-) of the servo P.C.B.
Connect CH2 of the oscilloscope to **TEG** (+) and **GND** (-) of the servo P.C.B.
Oscilloscope setting:VOLT.....200mV(CH1),
500mV(CH2)
SWEEP.....0.5msec.
INPUT.....AC(CH1),DC(CH2)
MODE.....NORM
(Triggering via CH1)
2.Set the test disc (SZZP1057C) and turn **ON** the power switch of the player.(Refer to page 13.)
3.Set the player to the play mode.
4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR103**, so that the waveform around the triggering point becomes as shown in the illustration.



TRACKING OFFSET BALANCE ADJUSTMENT

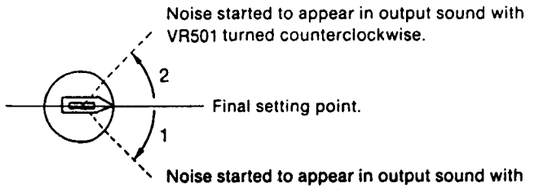
1.Set the low frequency oscillator to a frequency of **1kHz** and an output voltage of **200mVp-p**. Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
2.Connect CH1 of the oscilloscope to **TJ101** (+) and **GND** (-)of the servo P.C.B.
Oscilloscope setting:VOLT.....500mV
SWEEP.....0.5msec.
INPUT.....AC
2.Set a test disc (SZZP1014F or SZZP1054C) and turn **ON** the power switch of the player.(Refer to page 13.)
4.Set the player to the play mode.
5.Set the selector switch of the servo gain adjuster from **"2"** to **"1"**.
6.Adjust **VR106**, so that the output waveform is as shown (jitter is minimized).
7.Shift the selector switch of the servo gain adjuster from **"1"** to **"2"**.
8.Turn **OFF** the power switch of the player.
9.Disconnect the servo gain adjuster.



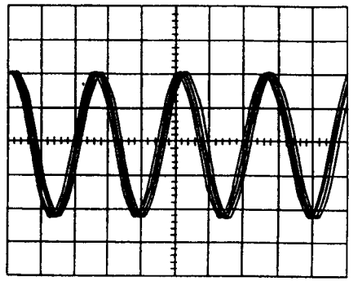
*Jitter should be minimized.

PLL ADJUSMENT

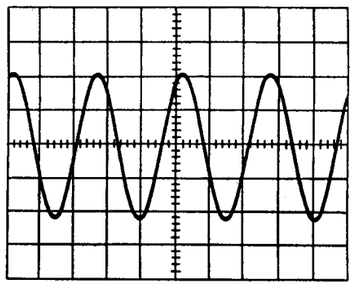
1.Connect CH1 of the oscilloscope to the **LINE OUT terminal** (either of Lch or Rch) and **ground.**
Oscilloscope setting:VOLT.....1V
SWEEP.....1msec.
INPUT.....DC
2.Set the **test disc (SZZP1054C)** and turn **ON** the power switch of the player. **(Refer to page 13.)**
3.Play **Track No.6 (wedge 0.7mm)** of the test disc.
4.Check the waveform displayed on the oscilloscope and adjust **VR501** in the following steps.
Step 1. Turn **VR501** clockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 2. Turn **VR501** counterclockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 3. Set **VR501** in the middle between the points observed in the above steps " 1 " and " 2 " .


Noise started to appear in output sound with VR501 turned counterclockwise.
2
Final setting point.
1
Noise started to appear in output sound with VR501 turned clockwise.

• NG



• OK



CHECK OF PLAY OPERATION AFTER ADJUSTMENT

Check of skip search
1.Play an ordinary disc.
2.Press the skip button and verify skip search operation (forward and reverse).

Check of manual search
1.Play an ordinary disc.
2.Press the manual search button and verify that smooth manual search can be performed at low and high speeds (forward and reverse).

Check of playability
1.Play the test disc (SZZP1054C).
2.Play the track No.6 (wedge 0.7mm) and verify that there is no skip sound or noise.
3.Play the track No.13 (black dot 0.7mm) and verify that there is no skip sound or noise.

OPTICAL PICKUP ADJUSTMENT

Measuring Instruments and Special Tools

- Two-channel oscilloscope (with trigger) of 30MHz or over
- Test discs
  Test disc (SZZP1014F) old or new type
  Inspection test disc (SZZP1054C)
  Uneven disc (SZZP1056C)
- Hexagonal wrench (2.0mm)
- Screw lock paint (RZZ0L01)
- Hexagonal wrench (1.27mm)
- Feeler gauge (RZZ0297)
- Filter **(Refer to page 18)**

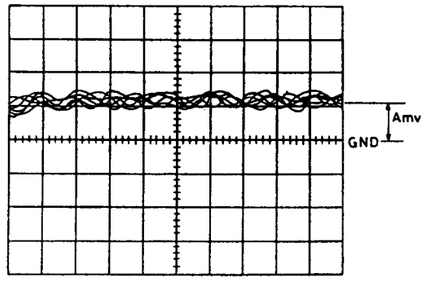
Adjustment Procedure

- If the optical pickup and spindle motor are replaced , adjust it according to the following procedure.

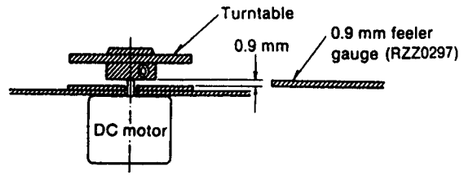
Step 1: Make the temporary of each VR. **(Refer to page 15.)**
↓
Step 2: Turntable height adjustment. **(Refer to page 18.)**
↓
Step 3: Mechanical adjustment. **(Refer to page 18.)**
↓
Step 4: Electrical adjustment. **(Refer to page 14.)**

TURNTABLE HEIGHT ADJUSTMENT

1.Connect CH1 of the oscilloscope to **FEG** (+) and **GND** (–) of the servo P.C.B.through the filter as shown below.
Oscilloscope setting:VOLT.....50mV
SWEEP.....1msec.
INPUT.....DC
2.Set the oscilloscope to DC zero balance.
3.Set a test disc (SZZP1014F or SZZP1054C and turn **ON** the power switch of the player.(Refer to page 11.)
4.Set the player to the play mode.
5.Measure the DC level (AmV) displayed on the oscilloscope.
- If the value of A is within the range of ± 60mV , the turntable height is correct. If it is not within this range , make the necessary adjustments using the 0.9mm feeler gauge (RZZ0297).
  If A is more than +60mV , make the turntable lower.
  If A is less than -60mV , make the turntable higher.

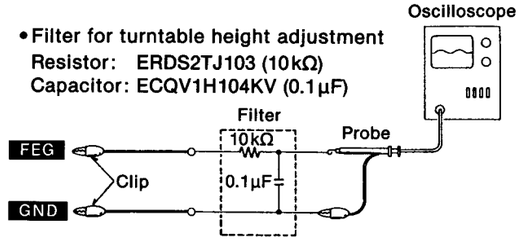


Adjust the turntable height as follow:
A.Insert the 0.9mm feeler gauge (RZZ0297) as shown below.



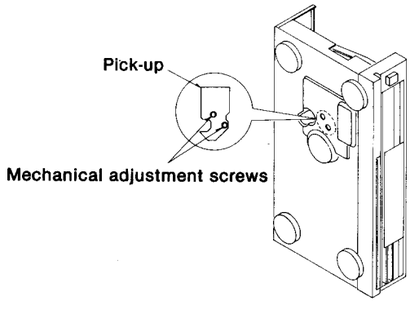
B.Loosen the turntable set-screw.
C.Adjust turntable height to 0.9mm with the feeler gauge as shown above.
D.Tighten the turntable set-screw by using the 1.27mm hexagonal wrench.
E.Check the turntable height adjustment by following steps 1 ~ 5 above.

• Filter for turntable height adjustment
Resistor: ERDS2TJ103 (10kΩ)
Capacitor: ECQV1H104KV (0.1μF)

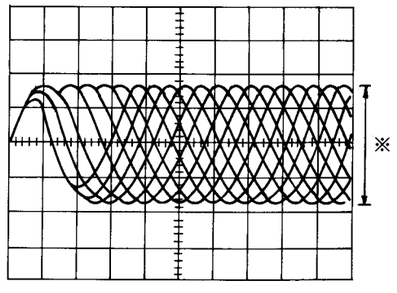


MECHANICAL ADJUSTMENT

1.Connect CH1 of the oscilloscope to **TJ101** (+) and **GND** (-) of the servo P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5μsec.
INPUT.....AC
2.Set the test disc (SZZP1056C) and turn **ON** the power swith of the player. **(Refer to page 13.)**
3.Using the manual search buttons , move the pickup so that the mechanical adjustment screws line up with the adjustment holes in the bottom panel.



4.Monitoring RF signal on the oscilloscope, adjust **the two adjusting screws** alternatelywith the 2.0mm hexagonal wrench so that the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.
5.Turn **OFF** the power switch of the player.
6.After the adjustment, apply **screw lock paint(RZZ0L01)** to the adjusting screws.



Note: The mechanical adjustment screws have been already locked with screw lock paint at the factory. It might be hard to turn them.

■ TERMINAL FUNCTION OF LSI

● MN6617S (Digital Signal Processing: EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O Division	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
2	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
3	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
4	CRC	O	Sub-code (Q data) CRC check (Not used, open)
5	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
6	MLD	I	Command load input
7	MCLK	I	Command clock input
8	MDATA	I	Command data input
9	DMUTE	I	Muting control (Not used, connected to GND)
10	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output
12	SMCK	O	Clock output (4.2336 MHz)
13	PMCK	O	Pitch control clock output (Not used, open)
14	ITC	I	Track counter input signal (Not used, open)
15	$\overline{\text{TEST}}$	I	Test mode selection (Not used, connected to +5V)
16	X2	O	Clock output (Not used, open)
17	X1	I	Clock input
18	SEL	I	DA output parallel/serial selection (serial at "L") (Not used, connected to GND)
19	LDG/WDC	O	L channel deglitch signal/serial data word clock. (Not used, open)
20	RDG	O	Clock signal output for spindle motor control (Not used, open)
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H") (Not used, open)
22	IPFLAG	O	Interpolation flag (interpolation at "H") (Not used, open)
23	FLAGO	O	Error flag (error at "H") (Not used, open)
24	FLAG6	O	16K RAM address reset signal (reset at "H") (Not used, open)
25	XCK	O	Clock (16.9344 MHz) output (Not used, open)
26	SRDATA	O	Serial data output (MSB first)
27	SRDATA	O	Serial data output (LSB first) (Not used, open)
28	SRCK	O	Serial data beat clock.
29	WDCK	O	Serial data word clock (Not used)
30	BYTCK	O	Serial data byte clock (Not used, open)
31	GND	I	GND terminal
32	R/L	O	R/L signal

Pin No.	Mark	I/O Division	Function
33	RESY	O	Resynchronizing signal (Not used, open)
34	FCLV	O	Synchronizing detection signal (Not used, open)
35	IPBYTE	O	Interpolation flag for each byte (Not used, open)
36	IPSEL	I/O	Interpolation prohibited (Not used, connected to GND)
37	FLAG5	O	C2 decoder correction flag 3 (Not used, open)
38	FLAG4	O	C2 decoder correction flag 2 (Not used, open)
39	FLAG3	O	C2 decoder correction flag 1 (Not used, open)
40	FLAG2	O	C1 decoder correction flag 2 (Not used, open)
41	FLAG1	O	C1 decoder correction flag 1 (Not used, open)
42	FLCK	O	Crystal frame clock
43 ∫ 50	D7 ∫ D0	I/O	16K RAM data output
51	RAMOE	O	16K RAM $\overline{\text{OE}}$ signal
52	RAMWE	O	16K RAM $\overline{\text{WE}}$ signal
53 ∫ 63	RAMA0 ∫ RAMA10	O	16K RAM address signal (RAMA0: LSB, RAMA10: MSB)
64	PC	O	Spindle motor ON signal (ON at "L")
65	EC	O	Spindle motor drive signal
66	FG	I	Spindle motor FG signal input (Not used, open)
67	VCNT	—	(Not used, open)
68	REXT	—	(Not used, open)
69	VDD	I	Power supply (+5V)
70	PD	—	(Not used, open)
71	PCKO	—	(Not used, open)
72	PCK	I	PLL extract clock input
73	VDD	I	Power supply (connected to +5V)
74	EFM	I	EFM signal input (PLL)
75	SRF	I	EFM signal input (DSL)
76	DO	I	Drop-out signal (Drop-out at "H")
77	CLVS	O	11T servo OK signal (OK at "H") (Not used, open)
78	FPC	O	PLL frequency comparision signal
79	BSSEL	O	PLL frequency in take operation signal. (Not used, open)
80	SRFO	—	(Not used, open)
81	NSRF	—	(Not used, open)
82	RF	—	(Not used, open)
83	SUBC	O	Sub-code serial output data (Not used, open)
84	SBCK	I	Clock for sub-code serial output (Not used, open)

● AN8370S (Optical Servo Control)

Pin No.	Mark	I/O Division	Function
1	VEE	I	Power supply (connected to −5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE(+)	I	Phase difference to voltage conversion (+)
9	TE(−)	I	Phase difference to voltage conversion (−)
10	APC(−)	I	Laser power inversion input
11	C.MEM	I	Capacitor connection for phase difference memory
12	APC(+)	I	Laser power non inversion input
13	VREFE	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Trackcrossing speed control output (Not used, open)
18	C.MSP	I	Trackcrossing reference speed setting capacitor connection (Not used, open)
19	C.AF	I	Auto focus timer capacitor connection
20	KICK	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)
22	CNT1	I	Control input (FOON Focus servo "ON" signal)

Pin No.	Mark	I/O Division	Function
23	CNT2	I	Control input (TRON Tracking servo ON signal)
24	CNT3	I	Control input (KICKF Kick direction [Foward] command)
25	CNT4	I	Control input (KICKR Kick direction [Reverse] command)
26	F.LOCK	O	Focus lock signal output
27	C.FBDO	O	Capacitor connection for inversion RF high detection
28	C.SBDO	O	Capacitor connection for inversion RF low detection
29	C.SBRT	O	Capacitor connection for non-inversion RF slow detection
30	C.FBRT	O	Capacitor connection for non-inversion RF fast detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RF IN	I	RF signal input
34	S.OUT	O	Focus search signal output
35	C.LW	I	Capacitor connection for triangular wave generation
36	FE.OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE.REF	I	Focus error comparison voltage generation
39	PDB	I	Photo detection current input (B)
40	IVB	O	Current/voltage conversion (B)
41	IVA	O	Current/voltage conversion (A)
42	PDA	I	Photo detection current input (A)

● AN8371S (Data slice and PLL)

Pin No.	Mark	I/O Division	Function
1	VEE	I	Power supply (connected to −5V)
2	SRF	O	RF signal output data-sliced into digital value
3	EFM	O	EFM signal output synchronized with PCK
4	D.GND	I	GND terminal (digital system)
5	PCK	O	Clock output extracted from SRF
6	VCC	I	Power supply (connected to +5V)
7	VA	I	VCO free run frequency adjusting current input (not connected)
8, 9	VC1, 2	I	Capacitor connection for VCO oscillator frequency
10	VR	I	Resistor connection for VCO oscillator frequency
11	PD	I	Capacitor connection for PLL DO protection
12	PL1	I	PLL loop filter connection

Pin No.	Mark	I/O Division	Function
13	PL2	I	PLL loop filter connection
14	FPC	I	Frequency comparison error signal input
15	RF	I	RF signal input
16	ARF	O	RF signal output with AGC output
17	AGC	I	ARF signal input for AGF drop-out detection input
18	AC	I	Loop filter for AGC connected
19	DO	O	Drop-out detection pulse output
20	A.GND	I	GND terminal (analog system)
21	DSL	I	RF signal input for data slicing
22	SLC	I	Slicing level control signal input
23	FC1	I	Filter capacitor for data slicer connected
24	FC2	I	Filter capacitor for data slicer connected

● MN1554PEP (System Control)

Pin No.	Mark	I/O Division	Function
1	BRECV	—	(Not used, open)
2	BSEND	—	(Not used, open)
3	SYNC	O	(Not used, open)
4	SIRQ	I	Not used (connected to +5V)
5	BLKCK	I	Sub-code block (Q data) clock input (75Hz)
6	CLDCK	I	Sub-code block (Q data) clock input (7.35kHz)
7	SBO	I	(Not used, open)
8	SUBQ	I	Sub-code (Q data) input
9	RST	I	Reset signal input
10 ~ 13	P20 ~ P23	O	Not used (connected to +5V)
14	CLOSE	O	Loading motor "Close" command
15	OPEN	O	Loading motor "Open" command
16	SLOW	O	(Not used, open)
17	MUTE	O	Muting control
18	SEEK	O	Traverse servo control (Not used, open)
19	NC	–	Not connected
20	TRV.R	O	Traverse "Reverse" command signal
21	TRV.F	O	Traverse "Forward" command signal
22	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [reverse] command)
23	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [forward] command)
24	CNT2	O	Optical servo IC control (TRON: Tracking servo)
25	VDD	I	Power supply (connected to +5V)
26	DOWN	O	(Not used, open)
27	UP	O	(Not used, open)
28	CNT1	O	Optical servo IC control signal (FOON: Focus servo)

Pin No.	Mark	I/O Division	Function
29	CLOSE	I	Disc holder "Open" detection
30	OPEN	I	Disc holder "Close" detection
31	BCLK	I	(Not used, connected to GND)
32	BDATA	I	(Not used, connected to GND)
33	STAT	I	Processing status input from signal processing LSI
34	COMP	O	TOC reading control (ON at "L") (connected to GND)
35	FLOCK	I	Optical servo condition (focus) input
36	SENSE	I	Optical servo condition (track cross) input
37	RECV	I	Data receipt command signal
38	SEND	I	Data transmission command
39	ACK	I	Data discrimination signal
40	CLK	I	Data lock signal
41 ~ 44	DATA0 ~ DATA3	I	Key scan signal
45 ~ 52	NC	I	Not connected
53	OSC2	I	Clock terminal
54	OSC1	I	Clock input
55	X1	I	Optical servo condition input
56	X0	O	(Not used, open)
57	GND	I	GND terminal
58	DMUTE	O	Muting control
59	MDATA	O	Command data output
60	MCLK	O	Data clock output (command clock)
61	MLD	O	Data output (command load)
62	DOUTON	O	Optical output control signal (Not used, open)
63	EMPH	O	Emphasis signal output
64	NC	—	Not connected

● MN152611 (FL Drive and Timing Signal Generator)

Pin No.	Mark	I/O Division	Function
1	VSS	I	GND terminal
2	X0	O	(Not used, open)
3	XI	I	Optical servo condition input (Not used, open)
4 ~ 7	P00 ~ P03	O	Key scan signal
8	P10(CLK)	O	Data lock signal
9	P11(ACK)	O	Data discrimination signal
10	P12(SEND)	O	Data transmission command signal
11	P13(RECV)	O	Data receipt command signal
12	$\overline{SYNC}$	O	(Not used, open)
13	$\overline{RST}$	I	Reset signal input (reset at "L")
14	$\overline{IRQ/TC1}$	I	Sub-code block (Q data) clock (75Hz) input (Not used, open)
15 ~ 18	P50 ~ P53	I	Key return signal
19	$\overline{SBT}$	I	Sub-code frame clock (7.35kHz) (Not used, open)
20	$\overline{SBD}$	I	Sub-code Q data input (Not used, open)
21 ~ 24	P20 ~ P23	O	Key scan signal
25	P30	—	(Not used, open)
26	P31	O	Key scan signal
27	P32	O	Key scan signal
28	P33	O	Key scan signal
29 ~ 31	P40 ~ P42	I	(Not used, connected to +5V)

Pin No.	Mark	I/O Division	Function
32	P43	I	Remote control signal input
33	PE0	O	(Not used, open)
34	PE1	O	(Not used, open)
35	P60	O	(Not used, open)
36	P61	O	(Not used, open)
37	DAC	O	(Not used, open)
38	VPP	I	FL drive power supply (connected to −33V)
39	D0	O	FL grid signal (Not used, open)
40	D1	O	FL grid signal (Not used, open)
41	D2	O	FL grid signal
42	D3	O	FL grid signal (Not used, open)
43 ~ 46	D4 ~ D7	O	FL grid signal
47 ~ 49	D8 ~ DA	O	FL grid signal (Not used, open)
50 • 51	DB • DC	O	FL grid signal
52	DD	O	FL grid signal (Not used, open)
53 ~ 61	S8 ~ S0	O	FL anode signal
62	VDD	I	Power supply (connected to +5V)
63	OSC2	I	Clock terminal
64	OSC1	I	Clock input

● MN6623 (Digital Filter and D/A Converter)

Pin No.	Mark	I/O Division	Function
1	MLD	I	Command load input (load: L)
2	RSTB	I	Reset signal input (reset at "L")
3	IE	I	I²S select terminal ("H"=I²S)
4	TP1	—	TEST terminal (Not connected)
5	TP2	—	
6	TEST1	I	TEST terminal 1 (connected to GND)
7	TEST2	I	TEST terminal 2 (connected to GND)
8	NC	—	Not connected
9	NC	—	Not connected
10	AVDD4	I	Power supply (connected to +5V)
11	OUTR(−)	O	Rch data output, (−) terminal
12	AVSS4	I	GND terminal
13	AVSS3	I	GND terminal
14	OUTR(+)	O	Rch data output, (+) terminal
15	AVDD3	I	Power supply (connected to +5V)
16	NC	—	Not connected
17	AVDD2	I	Power supply (connected to +5V)
18	OUTL(−)	O	Lch data output, (−) terminal
19	AVSS2	I	GND terminal (analog system)
20	AVSS1	I	GND terminal (analog system)
21	OUTL(+)	O	Lch data output, (+) terminal

Pin No.	Mark	I/O Division	Function
22	AVDD1	I	Power supply (connected to +5V)
23	AVDD1	I	Power supply (connected to +5V)
24	DVSS1	I	GND terminal (digital system)
25	X2	O	Clock output
26	X1	I	Clock input
27	NC	—	Not connected
28	DVDD2	I	Power supply (connected to +5V)
29	DVSS2	I	GND terminal (digital system)
30	NSUB	I	Not used (connected to GND)
31	768fs	O	768 fs (Not used)
32	192fs	O	192 fs (Not used)
33	LRPOL	I	LR clock selector (Not used)
34	LR	I	L/R clock
35	SRCK	I	Serial data best clock
36	SRDATA	I	Serial data input (MSB first)
37	DVSS 3	I	GND terminal (digital system)
38	NC	—	Not connected
39	384 fs	O	384 fs (16.9344MHz) output
40	PD	I	Power down terminal
41	MDATA	I	Command data input
42	MCLK	I	Command clock input

■ REPLACEMENT PARTS LIST (Electrical parts)

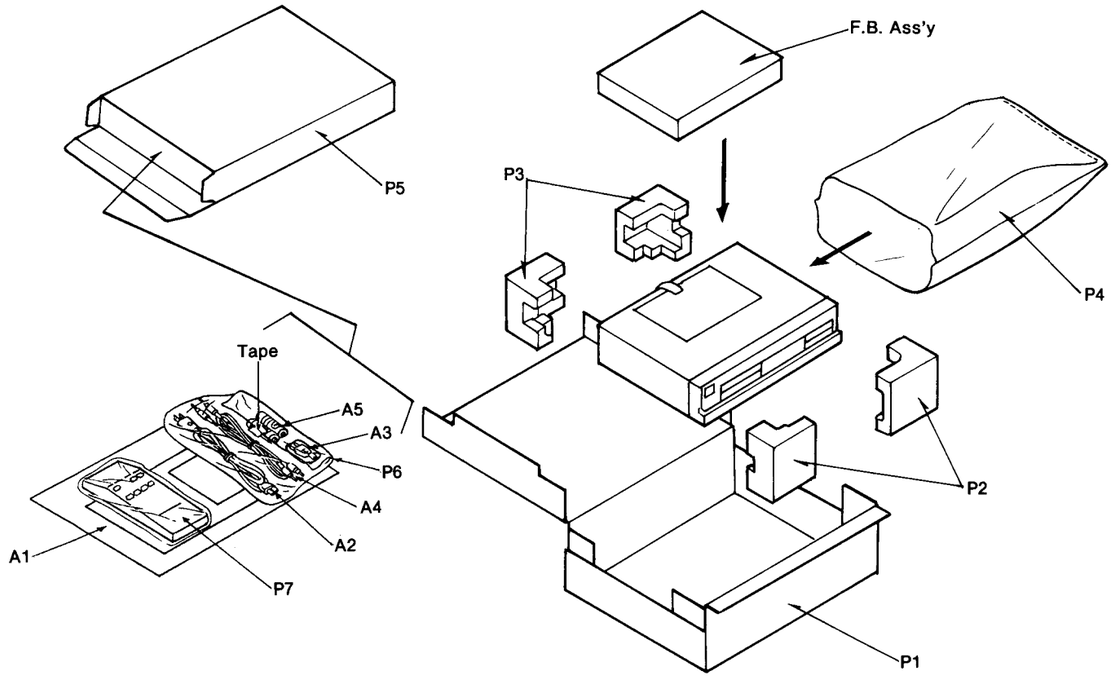
Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.
* Ⓜ Indicates parts that the supplied by **MESA.**
* "Ⓢ" mark parts are used for silver type only.
* "Ⓚ" mark parts are used for black type only.
Parts other than "Ⓢ" and "Ⓚ" marked are used for both silver and black types.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC11	LM2940T5	I.C. REGULATOR
IC13	SVIBA4558FT1	I.C. REGULATOR
IC101	AN8370S	I.C. OPTICAL SERVO
IC102	MN6636	I.C. ANALOG SW.
IC103	AN6554NS	I.C. OPERATION AMP.
IC104	AN6552S	I.C. OPERATION AMP.
IC105	AN6552S	I.C. OPERATION AMP.
IC106	AN6552S	I.C. OPERATION AMP.
IC201	LM2940T5	I.C. REGULATOR
IC202	AN6552S	I.C. REGULATOR
IC301	MN6617S	I.C. SIGNAL PROCESSING
IC302	SVICXK5816M	I.C. 16K RAM
IC401	MN1554PEP	I.C. SYSTEM CONTROL
IC402	SVIBA4558FT1	I.C. OPERATION AMP.
IC501	AN8371S	I.C. DATA SLICE/PLL
IC601	MN152611PEN	I.C. FL DRIVE
IC602 (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	HC-MD10E	I.C. REMOTE SENSOR
IC602 (M, MC)	HC-MD12M	I.C. REMOTE SENSOR
IC801	MN6623	I.C. D/A CONVERTER
IC802	SVINJM4560M	I.C. OPERATION AMP.
IC803	SVILM833M	I.C. OPERATION AMP.
IC804	SVINJM4560M	I.C. OPERATION AMP.
IC805	SVIH8DN2175	I.C. LPF
IC806	SVIH8DN2175	I.C. LPF
IC871	M5218L	I.C. HEADPHONES AMP.
TRANSISTORS		
Q11	2SB1240-P	TRANSISTOR
Q12	2SB1238QS	TRANSISTOR
Q13	2SD1862-P	TRANSISTOR
Q101	2SA1547-Q	TRANSISTOR
Q141	2SD1862-P	TRANSISTOR
Q142	2SB1240-P	TRANSISTOR
Q161	2SD1862-P	TRANSISTOR
Q162	2SB1240-P	TRANSISTOR
Q181	2SD1862-P	TRANSISTOR
Q182	2SB1240-P	TRANSISTOR
Q201	2SD1862-P	TRANSISTOR
Q203	2SD1862-P	TRANSISTOR
Q301	DTC124ES	TRANSISTOR
Q351	DTA124EST	TRANSISTOR
Q401	2SD1862-P	TRANSISTOR
Q402	2SB1240-P	TRANSISTOR
Q403	2SD1862-P	TRANSISTOR
Q404	2SB1240-P	TRANSISTOR
Q405	DTC124ES	TRANSISTOR
Q801	2SC3311A-Q	TRANSISTOR
Q802	2SC3311A-Q	TRANSISTOR
Q803	2SD1450RS	TRANSISTOR
Q804	2SD1450RS	TRANSISTOR
Q851	DTA124EST	TRANSISTOR
Q852	DTC124ES	TRANSISTOR
Q853	DTA114EST	TRANSISTOR
Q854	DTC124ES	TRANSISTOR
Q855	DTA124EST	TRANSISTOR
Q861	2SC3311A-Q	TRANSISTOR
Q862	2SA1309QRS	TRANSISTOR
Q881	2SD1450RS	TRANSISTOR
Q882	2SD1450RS	TRANSISTOR
DIODES		
D11 ⚠	SVD1SR35200A	RECTIFIER
D12 ⚠	SVD1SR35200A	RECTIFIER
D13 ⚠	SVD1SR35200A	RECTIFIER
D14 ⚠	SVD1SR35200A	RECTIFIER
D15 ⚠	SVD1SR35200A	RECTIFIER
D16	MA4330M	DIODE
D17 ⚠	SVD1SR35200A	RECTIFIER
D18	MA4062	DIODE
D21 ⚠	SVD1SR35200A	RECTIFIER
D22 ⚠	SVD1SR35200A	RECTIFIER
D23	MA4062-H	DIODE
D181	MA165	DIODE
D182	MA165	DIODE
D183	MA165	DIODE
D184	MA165	DIODE
D201	MA4056-M	DIODE
D401	MA165	DIODE
D410	MA4033M	DIODE
D411	MA165	DIODE
D601	MA165	DIODE
D602	MA165	DIODE
D603	MA165	DIODE
D604	MA165	DIODE
D606	MA165	DIODE
D607	MA165	DIODE
D608	MA165	DIODE
D609	MA165	DIODE
D610	MA165	DIODE
D851	MA165	DIODE
D852	MA165	DIODE
D853	MA165	DIODE
D854	MA165	DIODE
I.C.PROTECTORS		
IC1 ⚠ (EK, XA, XB) (PA, PE, PC)	SRUF38	I.C.PROTECTOR
IC2 ⚠ (EK, XA, XB) (PA, PE, PC)	SRUF38	I.C.PROTECTOR
ICP11 ⚠ (EK)	SRUN15	I.C.PROTECTOR
ICP12 ⚠ (EK)	SRUN15	I.C.PROTECTOR
VARIABLE RESISTORS		
VR101	EVND3AA00B53	V.R. BEST EYE ADJ.
VR102	EVND3AA00B14	V.R. TR GAIN ADJ.
VR103	EVND3AA00B14	V.R. TR OFFSET ADJ.
VR104	EVND3AA00B14	V.R. FO GAIN ADJ.
VR105	EVND3AA00B14	V.R. FO OFFSET ADJ.
VR106	EVND3AA00B53	V.R. TR BALANCE ADJ.
VR501	EVND3AA00B13	V.R. PLL ADJ.
VR871	EVUN1A019A15	V.R. HEADPHONES LEVEL
MAGNET RESISTOR ELEMENTS		
RA1	EWS7L0A00Q53	RESISTANCE UNIT
COILS AND TRANSFORMERS		
L871	ELEPK1R0KA	COIL
L872	ELEPK1R0KA	COIL
L873	ELEPK1R0KA	COIL
T1 ⚠ (M, MC)	SLTD5K065SC	POWER TRANSFORMER
T1 ⚠ (E, EG, EB, EH) (EF, EI)	SLTD5K066SE	POWER TRANSFORMER
T1 ⚠	SLTD5K067SG	POWER TRANSFORMER

Ref. No.	Part No.	Description
T1 ⚠ (XA, XB, PA) (PE, PC)	SLTD5K068SX	POWER TRANSFORMER
OSCILLATORS		
X801	SVQ49U338S	OSCILLATOR
DISPLAYS		
FL601	SAD12BT21GK	DISPLAY
FUSES		
F1 ⚠ (E, EK, XL, EG) (EB, EH, EF) (EI)	XBA2C012TB0S	FUSE(250V,T125mA)
F1 ⚠ (XA, XB, PA) (PE, PC)	XBA2C025TB0S	FUSE(250V,T250mA)
SWITCHES		
S1 ⚠	ESB8249V	SW, POWER
S2 ⚠ (XA, XB, PA) (PE, PC)	SSR187-1	SW, VOLTAGE SELECTOR
S101	SSPD17	SW, LOADING DET.
S102	SSPD18	SW, LOADING DET.
S601	EVQQS405K	SW, OPEN/CLOSE
S602	EVQQS405K	SW, STOP
S603	EVQQS405K	SW, PAUSE
S604	EVQQS405K	SW, PLAY
S605	EVQQS405K	SW, REPEAT
S606	EVQQS405K	SW, PROGRAM
S607	EVQQS405K	SW, R.SEARCH
S608	EVQQS405K	SW, F.SEARCH
S609	EVQQS405K	SW, R.INDEX
S610	EVQQS405K	SW, F.INDEX
S611	EVQQS405K	SW, EDIT
S612	EVQQS405K	SW, TIME
S613	EVQQS405K	SW, NUMERIC(0)
S614	EVQQS405K	SW, NUMERIC(3)
S615	EVQQS405K	SW, NUMERIC(2)
S616	EVQQS405K	SW, NUMERIC(1)
S617	EVQQS405K	SW, NUMERIC(+10)
S618	EVQQS405K	SW, NUMERIC(6)
S619	EVQQS405K	SW, NUMERIC(5)
S620	EVQQS405K	SW, NUMERIC(4)
S621	EVQQS405K	SW, NUMERIC(9)
S622	EVQQS405K	SW, NUMERIC(8)
S623	EVQQS405K	SW, NUMERIC(7)

■ PACKING

• F.B. Ass'y



Ref. No.	Part No.	Description
PACKING MATERIAL		
P1 Ⓚ (M, E, EG, EB) (EH, EI, EK) (XL, XA, XB) (PA, PE, PC)	SPND290	CARTON BOX
P1 Ⓚ (MC)	SPND291	CARTON BOX
P1 Ⓚ (EF)	SPND292	CARTON BOX
P1 Ⓢ (E, EG, EB, EH) (EI, EK, XL) (XB, XA)	SPND303	CARTON BOX
P1 Ⓢ (EF)	SPND304	CARTON BOX
P2	SPSD150	PAD
P3	SPSD151	PAD
P4	XZB55X40A01	PROTECTION BAG(UNIT)
P5	SPSD152	CARTON BOX(ACCESSORIES)
P6	XZB26X17C03	PROTECTION BAG(CORDS)
P7	XZB10X26B05S	PROTECTION BAG(REMOTE CONT.)
ACCESSORIES		
A1 (E, EB, EH)	SQXLP250-KE	INSTRUCTION MANUAL
A1 (MC)	SQXLP250-KMC	INSTRUCTION MANUAL
A1 (PA, PE, PC)	SQXLP250-KPA	INSTRUCTION MANUAL
A1 (XB)	SQXLP250-KXB	INSTRUCTION MANUAL
A1 (M)	SQX54598	INSTRUCTION MANUAL
A1 (XL, XA, EF)	SQX54600	INSTRUCTION MANUAL
A1 (EK)	SQX54602	INSTRUCTION MANUAL
A1 (EG)	SQX54603	INSTRUCTION MANUAL
A1 (EI)	SQX54604	INSTRUCTION MANUAL
A2 ⚠ (EK)	SFDAC05G02	POWER CORD
A2 ⚠ (XA, PA, PE) (PC)	SJA168	POWER CORD
A2 ⚠ (MC)	SJA172	POWER CORD
A2 ⚠ (XL)	SJA173	POWER CORD
A2 ⚠ (M)	SJA175-1	POWER CORD Ⓜ
A2 ⚠ (XB)	SJA183	POWER CORD
A2 ⚠ (E, EG, EB, EH) (EF, EI)	SJA187	POWER CORD
A3 ⚠ (XB, XA, PA) (PE, PC)	RJP120ZBS-H	AC PLUG ADAPTOR
A4	SJP2249-1	OUTPUT CORD
A5 (E, EG, EB, EH) (EF, EI, EK) (XL, XB, XA) (PA, PE, PC)	UM-4NE	BATTERY
A5 (M, MC)	UM-4NEP	BATTERY

■ RESISTORS AND CAPACITORS

Notes : * Important safety notice :
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* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1KΩ)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470Ω)

Numbering System of Capacitor

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (0.001μF)	Tolerance	Peculiarity
ECEA	50	M	330	
Type	Voltage (50V)	Pecliarity	Value (33μF)	

● Capacity are in microfarads (μF) unless specified otherwise, P = Pico-farads (pF) F = Farads (F).
● Resistance are in ohms (Ω), unless specified otherwise, 1K = 1,000Ω, 1M = 1,000kΩ

Resistor Type		Wattage		Tolerance
ERD	: Carbon	10 : 1/8W	12 : 1/2W	J : ±5%
ERG	: Metal Oxide	14 : 1/4W	25 : 1/4W	F : ±1%
ERQ	: Fuse Type Metal	1A : 1W	18 : 1/8W	G : ±2%
ERX	: Metal Film	S2 : 1/4W	S1 : 1/2W	J : ±5%
ERD L	: Carbon (chip)	2F : 1/4W	50 : 1/2W	K : ±10%
ERO K	: Metal Film (chip)	2A : 2W	3A : 3W	M : ±20%
ERC	: Solid	6G : 1/10W	8G : 1/8W	
ERF	: Incombustible Box-Shaped			
ERM	: Wire-Wound			
RRJ	: Cip Resistor			
ERJ	: Cip Resistor			

Capacitor Type		Voltage		Tolerance
ECE	: Electrolytic	0J : 6.3V	1A : 10V	K : ±10%
ECCD	: Ceramic	1C : 16V	1E : 25V	M : ±20%
ECKD	: Ceramic Capacitor	1H : 50V	1V : 35V	Z : +80 % −20
ECQM	: Poyester	50 : 50V	05 : 50V	J : ±5%
ECQP	: Polypropylene	2H : 500V	2A : 100V	G : ±2%
ECG	: Ceramic	1 : 100V	1J : 63V	F : ±1%
ECEA N	: Non Polar Electrolytic	KC : 400V AC		C : ±0.25pF
QCU	: Ceramic (Chip Type)	KC : 125V AC (UL)		D : ±0.5pF
ECUX	: Ceramic (Chip Type)			
ECF	: Semiconductor			
EECW	: Liquid electrolyte double layer capacitor			

Ref. No.	Part No.	Value.
RESISTORS(VALUE,WATTAGE)		
R11	ERDS2TJ101	100 1/4
R13	ERDS2TJ103	10K 1/4
R14	ERDS2TJ103	10K 1/4
R15	ERDS2TJ331	330 1/4
R16	ERDS2TJ102	1K 1/4
R16	ERDS2TJ471	470 1/4
R17	ERDS2TJ471	470 1/4
R101	ERJ6GEYJ154V	150K 1/10
R102	ERJ6GEYJ472V	4.7K 1/10
R103	ERJ6GEYJ472V	4.7K 1/10
R104	ERJ6GEYJ223V	22K 1/10
R105	ERJ6GEYJ334V	330K 1/10
R107	ERJ6GEYJ473V	47K 1/10
R108	ERJ6GEYJ332V	3.3K 1/10
R109	ERJ6GEYJ822	8.2K 1/10
R110	ERJ6GEYJ682V	6.8K 1/10
R111	ERJ6GEYJ682V	6.8K 1/10
R112	ERJ6GEYJ822	8.2K 1/10
R113	ERJ6GEYJ152V	1.5K 1/10
R114	ERJ6GEYJ152V	1.5K 1/10
R115	ERJ6GEYJ102V	1K 1/10
R116	ERJ6GEYJ182V	1.8K 1/10
R117	ERJ6GEYJ182V	1.8K 1/10
R118	ERJ6GEYJ102V	1K 1/10
R119	ERJ6GEYJ471	470 1/10
R120	ERJ6GEYJ120V	12 1/10
R122	ERJ6GEYJ471	470 1/10
R123	ERJ6GEYJ393V	39K 1/10
R141	ERJ6GEYJ102V	1K 1/10
R142	ERJ6GEYJ333V	33K 1/10
R143	ERJ6GEYJ124V	120K 1/10
R144	ERJ6GEYJ333V	33K 1/10
R145	ERJ6GEYJ153	15K 1/10
R146	ERJ6GEYJ122	1.2K 1/10
R147	ERJ6GEYJ682V	6.8K 1/10
R148	ERJ6GEYJ104V	100K 1/10
R149	ERJ6GEYJ152V	1.5K 1/10
R150	ERJ6GEYJ103V	10K 1/10
R151	ERJ6GEYJ101	100 1/10
R152	ERJ6GEYJ153	15K 1/10
R153	ERJ6GEYJ270V	27 1/10
R154	ERJ8GEYJ3R3V	3.3 1/8
R161	ERJ6GEYJ333V	33K 1/10
R162	ERJ6GEYJ222V	2.2K 1/10
R163	ERJ6GEYJ333V	33K 1/10
R164	ERJ6GEYJ153	15K 1/10
R165	ERJ6GEYJ122	1.2K 1/10
R166	ERJ6GEYJ102V	1K 1/10
R167	ERJ6GEYJ681V	680 1/10
R168	ERJ6GEYJ272V	2.7K 1/10
R169	ERJ6GEYJ392V	3.9K 1/10
R170	ERJ6GEYJ101	100 1/10
R171	ERJ6GEYJ270V	27 1/10
R172	ERJ8GEYJ3R3V	3.3 1/8
R180	ERJ6GEYJ474V	470K 1/10
R181	ERJ6GEYJ471	470 1/10
R182	ERJ6GEYJ564V	560K 1/10
R183	ERJ6GEYJ564V	560K 1/10
R184	ERJ6GEYJ223V	22K 1/10
R185	ERJ6GEYJ473V	47K 1/10
R186	ERJ6GEYJ473V	47K 1/10
R187	ERJ6GEYJ473V	47K 1/10
R188	ERJ6GEYJ473V	47K 1/10
R191	ERJ6GEYJ154V	150K 1/10
R192	ERJ6GEYJ824V	820K 1/10
R193	ERJ6GEYJ101	100 1/10
R194	ERJ6GEYJ683V	68K 1/10
R195	ERJ6GEYJ103V	10K 1/10
R196	ERJ6GEYJ103V	10K 1/10
R197	ERJ6GEYJ473V	47K 1/10
R198	ERJ6GEYJ393V	39K 1/10
R199	ERJ6GEYJ473V	47K 1/10
R201	ERJ6GEYJ102V	1K 1/10
R202	ERJ6GEYJ103V	10K 1/10
R203	ERJ6GEYJ102V	1K 1/10
R204	ERJ6GEYJ682V	6.8K 1/10
R205	ERJ6GEYJ682V	6.8K 1/10
R207	ERJ6GEYJ474V	470K 1/10
R208	ERJ6GEYJ680V	68 1/10
R214	ERJ6GEYJ471	470 1/10
R217	ERJ6GEYJ331	330 1/10
R218	ERJ6GEYJ101	100 1/10
R219	ERJ6GEYJ103V	10K 1/10
R230	ERJ6GEYJ223V	22K 1/10
R231	ERJ6GEYJ273V	27K 1/10
R232	ERJ6GEYJ681V	680 1/10
R233	ERJ6GEYJ471	470 1/10
R301	ERDS2TJ472	4.7K 1/4
R302	ERDS2TJ472	4.7K 1/4
R303	ERDS2TJ472	4.7K 1/4
R304	ERDS2TJ472	4.7K 1/4
R305	ERDS2TJ472	4.7K 1/4
R307	ERDS2TJ104	100K 1/4
R308	ERDS2TJ561	560 1/4
R309	ERDS2TJ472	4.7K 1/4
R310	ERDS2TJ222	2.2K 1/4
R311	ERDS2TJ472	4.7K 1/4
R312	ERDS2TJ4R7	4.7 1/4
R313	ERDS2TJ4R7	4.7 1/4
R314	ERDS2TJ182	1.8K 1/4
R351	ERDS2TJ103	10K 1/4
R352	ERDS2TJ334	330K 1/4
R353	ERDS2TJ123	12K 1/4
R354	ERDS2TJ274	270K 1/4
R355	ERDS2TJ333	33K 1/4
R356	ERDS2TJ333	33K 1/4
R357	ERD25FVJ8R2	8.2 1/4
R401	ERDS2TJ221	220 1/4
R402	ERDS2TJ221	220 1/4
R403	ERDS2TJ221	220 1/4
R404	ERDS2TJ221	220 1/4
R405	ERDS2TJ221	220 1/4
R406	ERDS2TJ221	220 1/4
R407	ERDS2TJ221	220 1/4
R408	ERDS2TJ221	220 1/4
R409	ERDS2TJ472	4.7K 1/4
R410	ERDS2TJ472	4.7K 1/4
R411	ERDS2TJ472	4.7K 1/4
R412	ERDS2TJ472	4.7K 1/4
R413	ERDS2TJ472	4.7K 1/4
R414	ERDS2TJ472	4.7K 1/4
R415	ERDS2TJ472	4.7K 1/4
R416	ERDS2TJ472	4.7K 1/4
R417	ERDS2TJ472	4.7K 1/4

Ref. No.	Part No.	Value.
R418	ERDS2TJ472	4.7K 1/4
R419	ERDS2TJ472	4.7K 1/4
R420	ERDS2TJ472	4.7K 1/4
R421	ERDS2TJ913	91K 1/4
R422	ERDS2TJ913	91K 1/4
R423	ERDS2TJ124	120K 1/4
R424	ERDS2TJ124	120K 1/4
R425	ERDS2TJ101	100 1/4
R426	ERDS2TJ101	100 1/4
R427	ERDS2TJ472	4.7K 1/4
R431	ERDS2TJ472	4.7K 1/4
R432	ERDS2TJ101	100 1/4
R433	ERDS2TJ153	15K 1/4
R434	ERDS2TJ393	39K 1/4
R435	ERDS2TJ102	1K 1/4
R501	ERJ6GEYJ104V	100K 1/10
R502	ERJ6GEYJ562	5.6K 1/10
R503	ERJ6GEYJ474V	470K 1/10
R504	ERJ6GEYJ101	100 1/10
R505	ERJ6GEYJ104V	100K 1/10
R506	ERJ6GEYJ333V	33K 1/10
R507	ERJ6GEYJ102V	1K 1/10
R601	ERDS2TJ472	4.7K 1/4
R602	ERDS2TJ472	4.7K 1/4
R603	ERDS2TJ472	4.7K 1/4
R604	ERDS2TJ472	4.7K 1/4
R605	ERDS2TJ472	4.7K 1/4
R607	ERDS2TJ103	10K 1/4
R608	ERDS2TJ103	10K 1/4
R613	ERDS2TJ105	1M 1/4
R801	ERDS2TJ103	10K 1/4
R802	ERDS2TJ103	10K 1/4
R803	ERDS2TJ103	10K 1/4
R804	ERDS2TJ103	10K 1/4
R805	ERDS2TJ273	27K 1/4
R806	ERDS2TJ273	27K 1/4
R807	ERDS2TJ273	27K 1/4
R808	ERDS2TJ273	27K 1/4
R809	ERDS2TJ473	47K 1/4
R810	ERDS2TJ473	47K 1/4
R811	ERDS2TJ473	47K 1/4
R812	ERDS2TJ473	47K 1/4
R813	ERDS2TJ221	220 1/4
R814	ERDS2TJ221	220 1/4
R815	ERDS2TJ474	470K 1/4
R816	ERDS2TJ474	470K 1/4
R817	ERDS2TJ104	100K 1/4
R818	ERDS2TJ104	100K 1/4
R819	ERDS2TJ681	680 1/4
R820	ERDS2TJ681	680 1/4
R821	ERDS2TJ473	47K 1/4
R822	ERDS2TJ473	47K 1/4
R823	ERDS2TJ331	330 1/4
R824	ERDS2TJ121	120 1/4
R825	ERDS2TJ121	120 1/4
R826	ERDS2TJ104	100K 1/4
R827	ERDS2TJ104	100K 1/4
R831	ERDS2TJ222	2.2K 1/4
R840	ERDS2TJ331	330 1/4
R841	ERDS2TJ105	1M 1/4
R842	ERDS2TJ105	1M 1/4
R851	ERDS2TJ102	1K 1/4
R852	ERDS2TJ471	470 1/4
R853	ERDS2TJ104	100K 1/4
R854	ERDS2TJ683	68K 1/4
R855	ERDS2TJ102	1K 1/4
R856	ERDS2TJ102	1K 1/4
R857	ERDS2TJ102	1K 1/4
R858	ERDS2TJ102	1K 1/4
R861	ERDS2TJ102	1K 1/4
R862	ERDS2TJ102	1K 1/4
R871	ERDS2TJ103	10K 1/4
R872	ERDS2TJ103	10K 1/4
R873	ERDS2TJ473	47K 1/4
R874	ERDS2TJ473	47K 1/4
R875	ERDS2TJ121	120 1/4
R876	ERDS2TJ121	120 1/4
R877	ERDS2TJ103	10K 1/4
R878	ERDS2TJ103	10K 1/4
R879	ERDS2TJ222	2.2K 1/4
R880	ERDS2TJ222	2.2K 1/4
CAPACITORS(VALUE,VOLTAGE)		
C1 ⚠	ECKDKC103PF2	0.01 125
C2 ⚠	ECKM1H103ZFX	0.01 50
C3 ⚠	ECKM1H103ZFX	0.01 50
C10	ECEA1CU222	2200 16
C11	ECEA1CU222	2200 16
C12	ECEA1VU101	100 35
C13	ECEA1AK101	100 10
C14	ECEA1AK101	100 10
C15	ECEA0JK470	47 6.3
C16	ECEA1CU331	330 16
C17	ECEA1CU331	330 16
C18	ECEA1VU101	100 35
C21	ECEA1CU221	220 16
C30	ECFR1E104ZF5	0.1 25
C101	RCUV1E104ZF	0.1 25
C102	RCUV1H102KB	0.001 50
C103	RCUV1H102KB	0.001 50
C104	RCUV1H681K	680P 50
C105	RCUV1H471KB	470P 50
C106	RCUV1H471KB	470P 50
C107	RCUV1H220KC	22P 50
C108	ECEA1HKK0R1	0.1 50
C109	ECEA1HKK010	1 50
C110	ECQV1H104JZ	0.1 50
C111	ECEA1AKK100	10 10
C112	ECEA1AKK100	10 10
C113	ECEA1HSN010	1 50
C114	RCUV1H182KB	0.0018 50
C115	RCUV1H682KB	0.0068 50
C116	RCUV1E333KB	0.033 25
C117	RCUV1H221KB	220P 50
C118	ECEA1HKK010	1 50
C119	ECEA0JKS220I	22 6.3
C120	RCUV1H681K	680P 50
C121	RCUV1E103KB	0.01 25
C122	RCUV1H101KC	100P 50
C123	RCUV1H101KC	100P 50
C125	ECEA0JKS220I	22 6.3
C126	ECEA0JKS470	47 6.3
C127	RCUV1H102KB	0.001 50
C128	RCUV1H102KB	0.001 50
C129	RCUV1H681K	680P 50
C141	RCUV1E153KB	0.015 25
C142	RCUV1H122KB	1200P 50
C143	ECUV1E473KB	0.047 25
C144	ECEA1VSN2R2I	2.2 35
C145	ECEA1HSNR22	0.22 50
C161	RCUV1E153KB	0.015 25
C162	RCUV1H681K	680P 50
C163	RCUV1E103KB	0.01 25
C164	ECEA1ESN3R3I	3.3 25
C165	ECEA1HSN0R1	0.1 50
C181	ECQV1H474JZ3	0.47 50
C182	RCUV1H221KB	220P 50
C183	RCUV1H682KB	0.0068 50
C184	ECEA1HSN010	1 50
C186	ECUV1C224KR	0.22 16
C201	RCUV1E103KB	0.01 25
C221	ECEA0JKS1011	100 6.3
C222	ECEA0JKA101B	100 6.3
C223	ECEA0JKA101B	100 6.3
C224	RCUV1E104ZF	0.1 25
C226	RCUV1E104ZF	0.1 25
C227	RCUV1E104ZF	0.1 25
C228	ECUV1E823KB	0.082 25
C230	ECUV1E473KB	0.047 25
C301	ECFR1E104ZF5	0.1 25
C302	ECBT1C103NS	0.01 16
C303	ECFR1E104ZF5	0.1 25
C306	ECEA0JK101	100 6.3
C307	ECFR1E104ZF5	0.1 25
C308	ECFR1E104ZF5	0.1 25
C309	ECBT1C103NS	0.01 16
C310	ECFR1E104ZF	0.1 25
C351	ECBT1H102KB	0.001 50
C401	ECEA0JK470	47 6.3
C402	ECFR1E104ZF5	0.1 25
C403	ECFR1E104ZF5	0.1 25
C404	ECFR1E104ZF5	0.1 25
C405	ECBT1H102KB	0.001 50
C406	ECBT1H102KB	0.001 50
C407	ECEA1HKN010	1 50
C501	ECUV1E104KB	0.1 25
C502	ECQV1H104JZ	0.1 50
C503	ECEA1AKK100	10 10
C504	RCUV1E104ZF	0.1 25
C505	RCUV1E104ZF	0.1 25
C506	RCUV1H150K	15P 50
C507	RCUV1H102KB	0.001 50
C508	ECEA1ASN100	10 10
C509	RCUV1H100DC	10P 50
C510	ECUV1E104KB	0.1 25
C511	ECEA1HKSR47	0.47 50
C512	RCUV1H681K	680P 50
C513	RCUV1H681K	680P 50
C514	ECUV1C224KR	0.22 16
C515	RCUV1E153KB	0.015 25
C516	ECEA1VSN2R2I	2.2 35
C517	RCUV1H471KB	470P 50
C519	ECUV1C224KR	0.22 16
C520	RCUV1H472KB	0.0047 50
C601	ECBT1H223ZF	0.022 50
C602	ECEA0JK470	47 6.3
C603	ECBT1E223ZF	0.022 25
C604	ECBT1E223ZF	0.022 25
C801	ECBT1H680J	68P 50
C802	ECBT1H680J	68P 50
C803	ECBT1H680J	68P 50
C804	ECBT1H680J	68P 50
C805	ECBT1H470J5	47P 50
C806	ECBT1H470J5	47P 50
C807	ECBT1H470J5	47P 50
C808	ECBT1H470J5	47P 50
C809	ECEA1EN3R3S	3.3 25
C810	ECEA1EN3R3S	3.3 25
C811	ECBT1H102KB	0.001 50
C812	ECBT1H102KB	0.001 50
C813	ECEA1CN220S	22 16
C814	ECEA1CN220S	22 16
C815	ECBT1H102KB	0.001 50
C816	ECBT1H102KB	0.001 50
C822	ECBT1H5R6K5	5.6P 50
C824	ECBT1H5R6K5	5.6P 50
C830	ECEA1CN220S	22 16
C831	ECEA1CN220S	22 16
C840	ECFR1E104ZF	0.1 25
C841	ECEA0JS331	330 6.3
C842	ECEA0JS331	330 6.3
C851	ECEA0JU471	470 6.3
C852	ECEA0JS331	330 6.3
C853	ECEA1HKN2R2B	2.2 50
C854	ECFR1E104ZF5	0.1 25
C855	ECFR1E104ZF5	0.1 25
C856	ECFR1E104ZF5	0.1 25
C857	ECFR1E104ZF5	0.1 25
C858	ECFR1E104ZF5	0.1 25
C859	ECFR1E104ZF5	0.1 25
C861	ECEA1AK101	100 10
C862	ECEA1AK101	100 10
C871	ECBT1E223ZF	0.022 25
C872	ECBT1E223ZF	0.022 25
C873	ECBT1E103ZF	0.01 25
C874	ECBT1E103ZF	0.01 25
C875	ECBT1E103ZF	0.01 25
C877	ECEA1AKN100B	10 10
C878	ECEA1AKN100B	10 10

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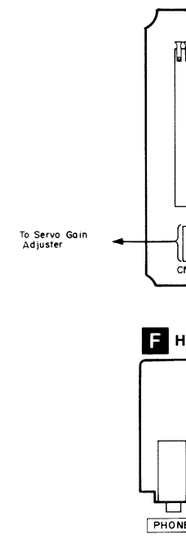


ese components use only

	Tolerance
W	J : ±5%
W	F : ±1%
W	G : ±2%
W	J : ±5%
W	K : ±10%
	M : ±20%
W	

	Tolerance
	K : ±10%
	M : ±20%
	Z : +80 % −20
V	J : ±5%
	G : ±2%
	F : ±1%
	C : ±0.25pF
	D : ±0.5pF

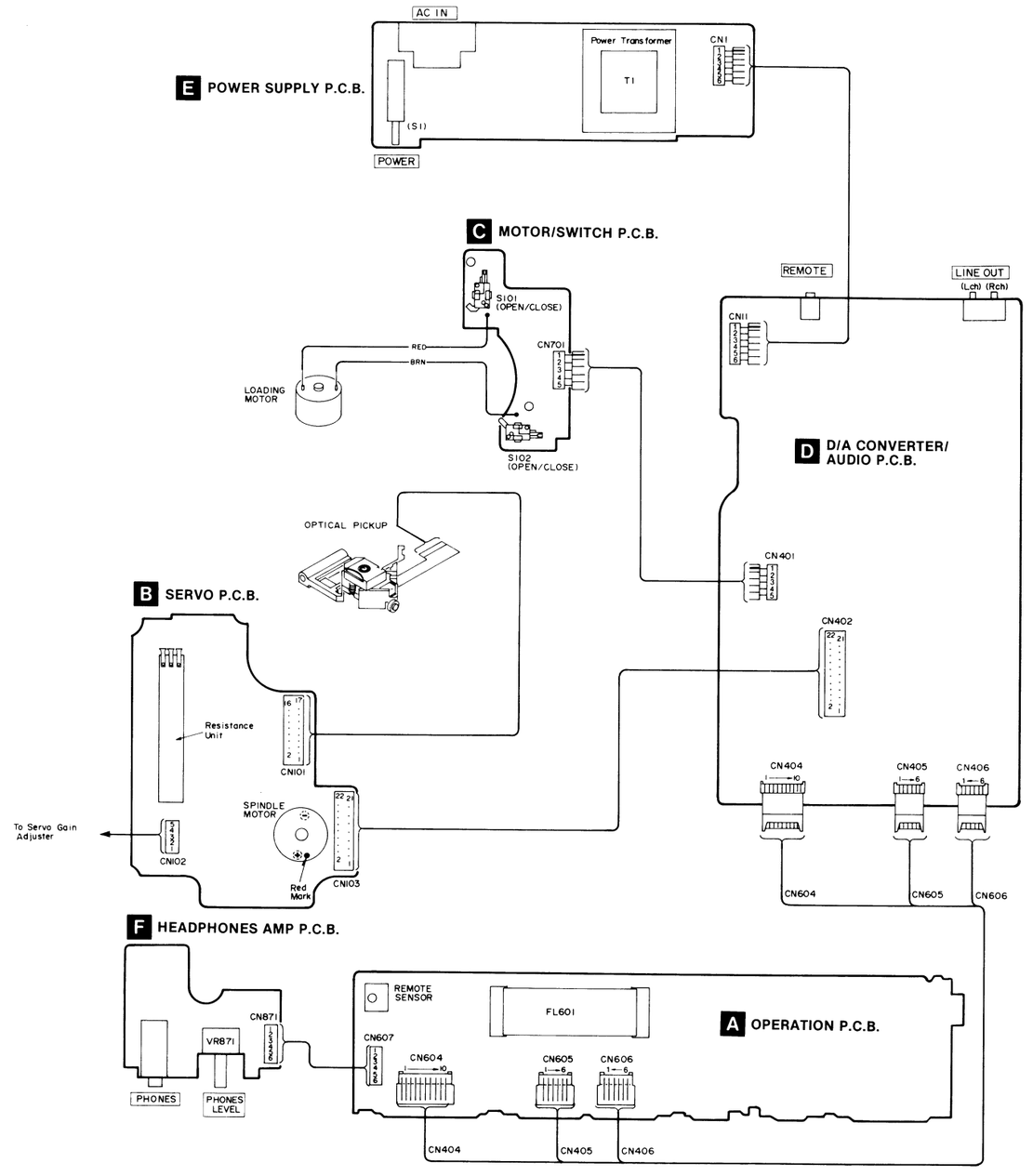
o.	Value.		
J103V	10K	1/10	
J223V	22K	1/10	
J273V	27K	1/10	
J681V	680	1/10	
J471	470	1/10	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
04	100K	1/4	
61	560	1/4	
72	4.7K	1/4	
22	2.2K	1/4	
72	4.7K	1/4	
R7	4.7	1/4	
R7	4.7	1/4	
82	1.8K	1/4	
03	10K	1/4	
34	330K	1/4	
23	12K	1/4	
74	270K	1/4	
33	33K	1/4	
33	33K	1/4	
8R2	8.2	1/4	
21	220	1/4	
21	220	1/4	
21	220	1/4	
21	220	1/4	
21	220	1/4	
21	220	1/4	
21	220	1/4	
21	220	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	
72	4.7K	1/4	

Ref. No.	Part No.	Value.
R418	ERDS2TJ472	4.7K 1/4
R419	ERDS2TJ472	4.7K 1/4
R420	ERDS2TJ472	4.7K 1/4
R421	ERDS2TJ913	91K 1/4
R422	ERDS2TJ913	91K 1/4
R423	ERDS2TJ124	120K 1/4
R424	ERDS2TJ124	120K 1/4
R425	ERDS2TJ101	100 1/4
R426	ERDS2TJ101	100 1/4
R427	ERDS2TJ472	4.7K 1/4
R431	ERDS2TJ472	4.7K 1/4
R432	ERDS2TJ101	100 1/4
R433	ERDS2TJ153	15K 1/4
R434	ERDS2TJ393	39K 1/4
R435	ERDS2TJ102	1K 1/4
R501	ERJ6GEYJ104V	100K 1/10
R502	ERJ6GEYJ562	5.6K 1/10
R503	ERJ6GEYJ474V	470K 1/10
R504	ERJ6GEYJ101	100 1/10
R505	ERJ6GEYJ104V	100K 1/10
R506	ERJ6GEYJ333V	33K 1/10
R507	ERJ6GEYJ102V	1K 1/10
R601	ERDS2TJ472	4.7K 1/4
R602	ERDS2TJ472	4.7K 1/4
R603	ERDS2TJ472	4.7K 1/4
R604	ERDS2TJ472	4.7K 1/4
R605	ERDS2TJ472	4.7K 1/4
R607	ERDS2TJ103	10K 1/4
R608	ERDS2TJ103	10K 1/4
R613	ERDS2TJ105	1M 1/4
R801	ERDS2TJ103	10K 1/4
R802	ERDS2TJ103	10K 1/4
R803	ERDS2TJ103	10K 1/4
R804	ERDS2TJ103	10K 1/4
R805	ERDS2TJ273	27K 1/4
R806	ERDS2TJ273	27K 1/4
R807	ERDS2TJ273	27K 1/4
R808	ERDS2TJ273	27K 1/4
R809	ERDS2TJ473	47K 1/4
R810	ERDS2TJ473	47K 1/4
R811	ERDS2TJ473	47K 1/4
R812	ERDS2TJ473	47K 1/4
R813	ERDS2TJ221	220 1/4
R814	ERDS2TJ221	220 1/4
R815	ERDS2TJ474	470K 1/4
R816	ERDS2TJ474	470K 1/4
R817	ERDS2TJ104	100K 1/4
R818	ERDS2TJ104	100K 1/4
R819	ERDS2TJ681	680 1/4
R820	ERDS2TJ681	680 1/4
R821	ERDS2TJ473	47K 1/4
R822	ERDS2TJ473	47K 1/4
R823	ERDS2TJ331	330 1/4
R824	ERDS2TJ121	120 1/4
R825	ERDS2TJ121	120 1/4
R826	ERDS2TJ104	100K 1/4
R827	ERDS2TJ104	100K 1/4
R831	ERDS2TJ222	2.2K 1/4
R840	ERDS2TJ331	330 1/4
R841	ERDS2TJ105	1M 1/4
R842	ERDS2TJ105	1M 1/4
R851	ERDS2TJ102	1K 1/4
R852	ERDS2TJ471	470 1/4
R853	ERDS2TJ104	100K 1/4
R854	ERDS2TJ683	68K 1/4
R855	ERDS2TJ102	1K 1/4
R856	ERDS2TJ102	1K 1/4
R857	ERDS2TJ102	1K 1/4
R858	ERDS2TJ102	1K 1/4
R861	ERDS2TJ102	1K 1/4
R862	ERDS2TJ102	1K 1/4
R871	ERDS2TJ103	10K 1/4
R872	ERDS2TJ103	10K 1/4
R873	ERDS2TJ473	47K 1/4
R874	ERDS2TJ473	47K 1/4
R875	ERDS2TJ121	120 1/4
R876	ERDS2TJ121	120 1/4
R877	ERDS2TJ103	10K 1/4
R878	ERDS2TJ103	10K 1/4
R879	ERDS2TJ222	2.2K 1/4
R880	ERDS2TJ222	2.2K 1/4

CAPACITORS(VALUE,VOLTAGE)

Ref. No.	Part No.	Value.
C1 ⚠	ECKDKC103PF2	0.01 125
C2 ⚠	ECKM1H103ZFX	0.01 50
C3 ⚠	ECKM1H103ZFX	0.01 50
C10	ECEA1CU222	2200 16
C11	ECEA1CU222	2200 16
C12	ECEA1VU101	100 35
C13	ECEA1AK101	100 10
C14	ECEA1AK101	100 10
C15	ECEA0JK470	47 6.3
C16	ECEA1CU331	330 16
C17	ECEA1CU331	330 16
C18	ECEA1VU101	100 35
C21	ECEA1CU221	220 16
C30	ECFR1E104ZF5	0.1 25
C101	RCUV1E104ZF	0.1 25
C102	RCUV1H102KB	0.001 50
C103	RCUV1H102KB	0.001 50
C104	RCUV1H681K	680P 50
C105	RCUV1H471KB	470P 50
C106	RCUV1H471KB	470P 50
C107	RCUV1H220KC	22P 50
C108	ECEA1HKK0R1	0.1 50
C109	ECEA1HKK010	1 50
C110	ECQV1H104JZ	0.1 50
C111	ECEA1AKK100	10 10
C112	ECEA1AKK100	10 10
C113	ECEA1HSN010	1 50
C114	RCUV1H182KB	0.0018 50
C115	RCUV1H682KB	0.0068 50
C116	RCUV1E333KB	0.033 25
C117	RCUV1H221KB	220P 50
C118	ECEA1HKK010	1 50
C119	ECEA0JKS2201	22 6.3
C120	RCUV1H681K	680P 50
C121	RCUV1E103KB	0.01 25
C122	RCUV1H101KC	100P 50
C123	RCUV1H101KC	100P 50
C125	ECEA0JKS2201	22 6.3
C126	ECEA0JKS470	47 6.3
C127	RCUV1H102KB	0.001 50
C128	RCUV1H102KB	0.001 50
C129	RCUV1H681K	680P 50
C141	RCUV1E153KB	0.015 25
C142	RCUV1H122KB	1200P 50
C143	ECUV1E473KB	0.047 25
C144	ECEA1VSN2R2I	2.2 35
C145	ECEA1HSNR22	0.22 50
C161	RCUV1E153KB	0.015 25
C162	RCUV1H681K	680P 50
C163	RCUV1E103KB	0.01 25
C164	ECEA1ESN3R3I	3.3 25
C165	ECEA1HSN0R1	0.1 50
C181	ECQV1H474JZ3	0.47 50
C182	RCUV1H221KB	220P 50
C183	RCUV1H682KB	0.0068 50
C184	ECEA1HSN010	1 50
C186	ECUV1C224KR	0.22 16
C201	RCUV1E103KB	0.01 25
C221	ECEA0JKS1011	100 6.3
C222	ECEA0JKA101B	100 6.3
C223	ECEA0JKA101B	100 6.3
C224	RCUV1E104ZF	0.1 25
C226	RCUV1E104ZF	0.1 25
C227	RCUV1E104ZF	0.1 25
C228	ECUV1E823KB	0.082 25
C230	ECUV1E473KB	0.047 25
C301	ECFR1E104ZF5	0.1 25
C302	ECBT1C103NS	0.01 16
C303	ECFR1E104ZF5	0.1 25
C306	ECEA0JK101	100 6.3
C307	ECFR1E104ZF5	0.1 25
C308	ECFR1E104ZF5	0.1 25
C309	ECBT1C103NS	0.01 16
C310	ECFR1E104ZF	0.1 25
C351	ECBT1H102KB	0.001 50
C401	ECEA0JK470	47 6.3
C402	ECFR1E104ZF5	0.1 25
C403	ECFR1E104ZF5	0.1 25
C404	ECFR1E104ZF5	0.1 25
C405	ECBT1H102KB	0.001 50
C406	ECBT1H102KB	0.001 50
C407	ECEA1HKN010	1 50
C501	ECUV1E104KB	0.1 25
C502	ECQV1H104JZ	0.1 50
C503	ECEA1AKK100	10 10
C504	RCUV1E104ZF	0.1 25
C505	RCUV1E104ZF	0.1 25
C506	RCUV1H150K	15P 50
C507	RCUV1H102KB	0.001 50
C508	ECEA1ASN100	10 10
C509	RCUV1H100DC	10P 50
C510	ECUV1E104KB	0.1 25
C511	ECEA1HKSR47	0.47 50
C512	RCUV1H681K	680P 50
C513	RCUV1H681K	680P 50
C514	ECUV1C224KR	0.22 16
C515	RCUV1E153KB	0.015 25
C516	ECEA1VSN2R2I	2.2 35
C517	RCUV1H471KB	470P 50
C519	ECUV1C224KR	0.22 16
C520	RCUV1H472KB	0.0047 50
C601	ECBT1H223ZF	0.022 50
C602	ECEA0JK470	47 6.3
C603	ECBT1E223ZF	0.022 25
C604	ECBT1E223ZF	0.022 25
C801	ECBT1H680J	68P 50
C802	ECBT1H680J	68P 50
C803	ECBT1H680J	68P 50
C804	ECBT1H680J	68P 50
C805	ECBT1H470J5	47P 50
C806	ECBT1H470J5	47P 50
C807	ECBT1H470J5	47P 50
C808	ECBT1H470J5	47P 50
C809	ECEA1EN3R3S	3.3 25
C810	ECEA1EN3R3S	3.3 25
C811	ECBT1H102KB	0.001 50
C812	ECBT1H102KB	0.001 50
C813	ECEA1CN220S	22 16
C814	ECEA1CN220S	22 16
C815	ECBT1H102KB	0.001 50
C816	ECBT1H102KB	0.001 50
C822	ECBT1H5R6K5	5.6P 50
C824	ECBT1H5R6K5	5.6P 50
C830	ECEA1CN220S	22 16
C831	ECEA1CN220S	22 16
C840	ECFR1E104ZF	0.1 25
C841	ECEA0JS331	330 6.3
C842	ECEA0JS331	330 6.3
C851	ECEA0JU471	470 6.3
C852	ECEA0JS331	330 6.3
C853	ECEA1HKN2R2B	2.2 50
C854	ECFR1E104ZF5	0.1 25
C855	ECFR1E104ZF5	0.1 25
C856	ECFR1E104ZF5	0.1 25
C857	ECFR1E104ZF5	0.1 25
C858	ECFR1E104ZF5	0.1 25
C859	ECFR1E104ZF5	0.1 25
C861	ECEA1AK101	100 10
C862	ECEA1AK101	100 10
C871	ECBT1E223ZF	0.022 25
C872	ECBT1E223ZF	0.022 25
C873	ECBT1E103ZF	0.01 25
C874	ECBT1E103ZF	0.01 25
C875	ECBT1E103ZF	0.01 25
C877	ECEA1AKN100B	10 10
C878	ECEA1AKN100B	10 10

■ PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



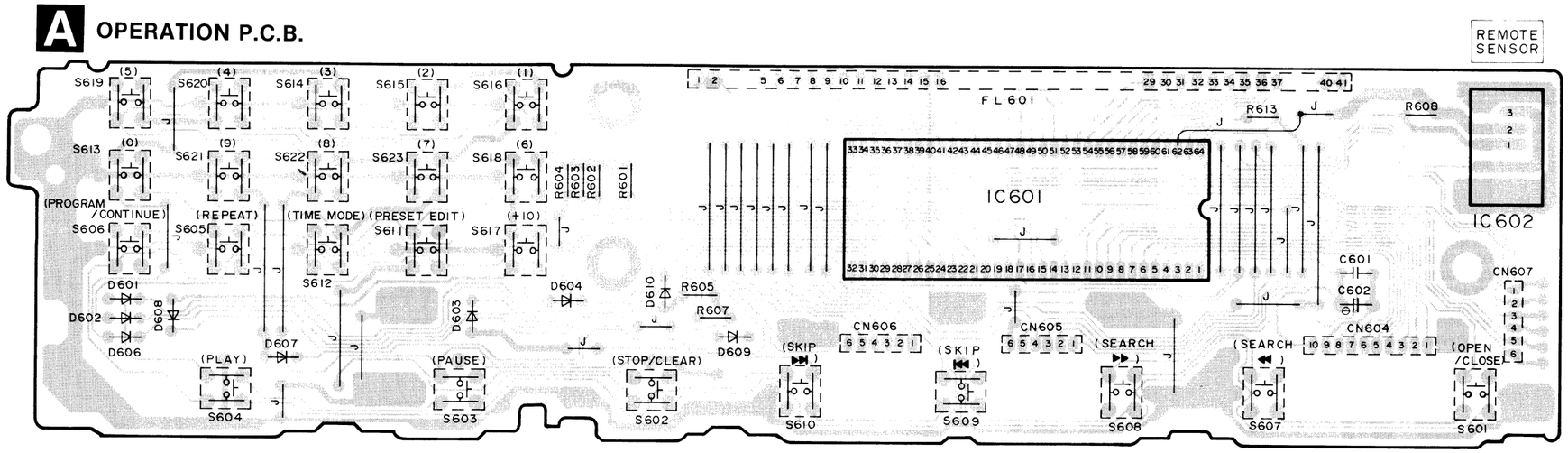
SL-P250 SL-P250

1 2 3 4 5 6 7 8 9 10

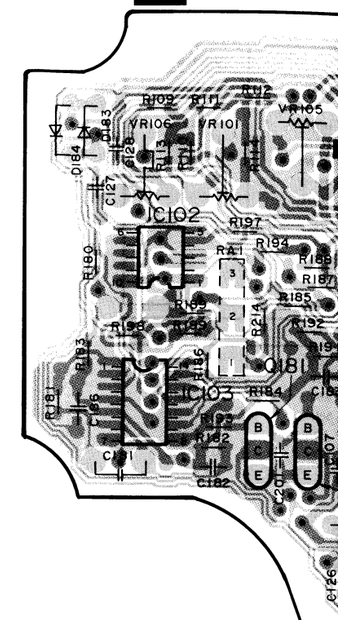
A B C D E F G

■PRINTED CIRCUIT BOARDS

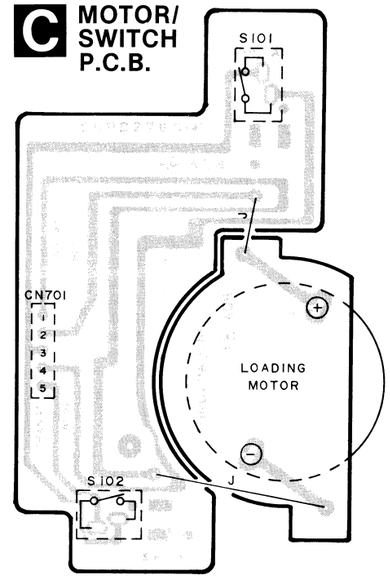
A OPERATION P.C.B.



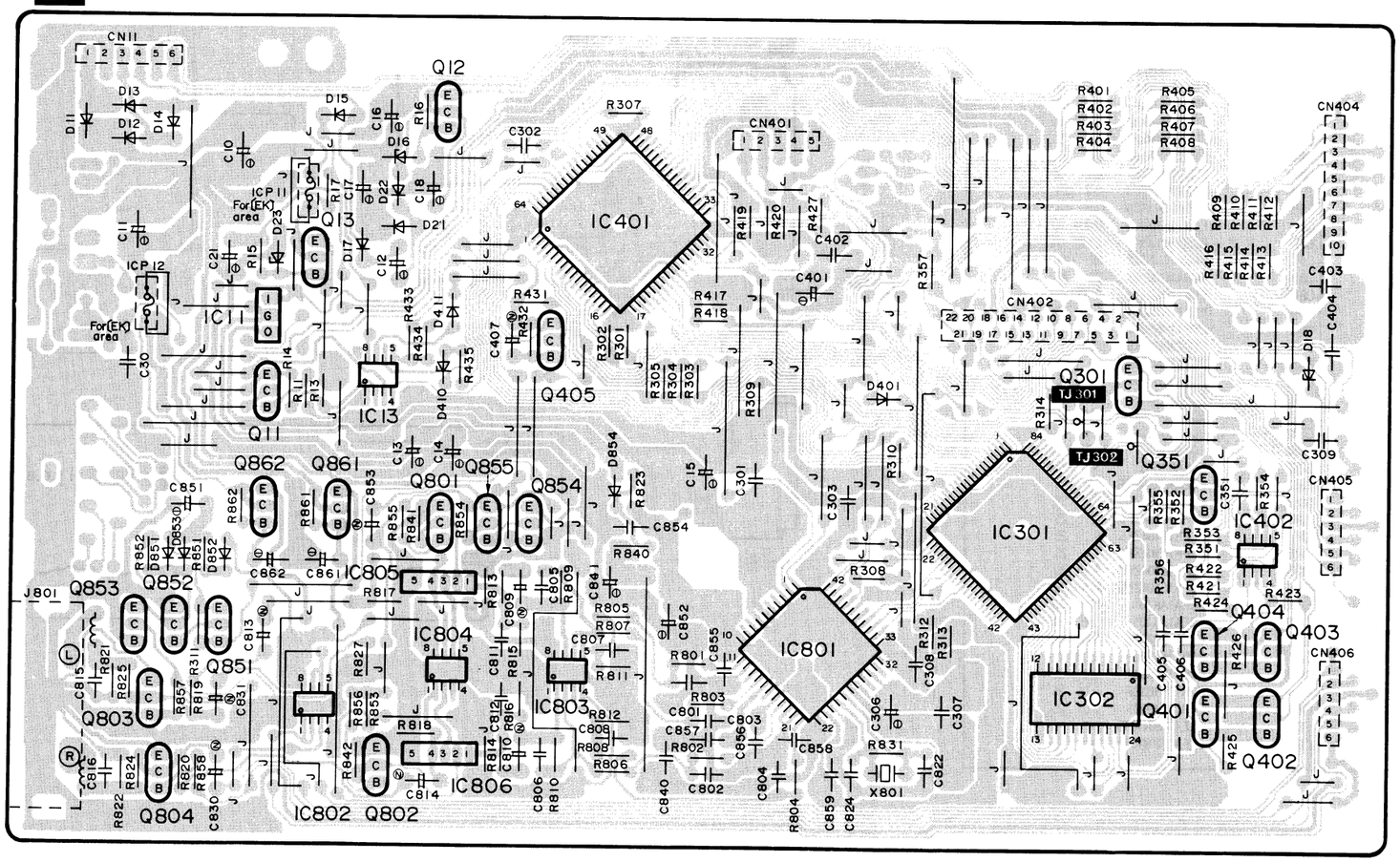
B SERVO P.C.



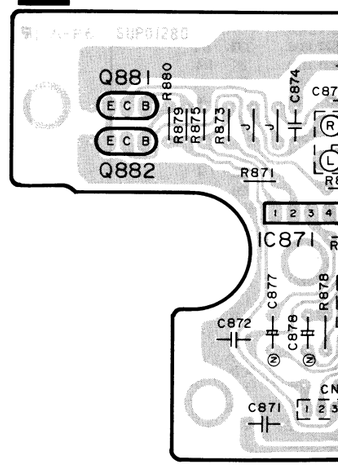
C MOTOR/ SWITCH P.C.B.



D D/A CONVERTER/AUDIO P.C.B.



F HEADPHONES AMP P



5 6 7 8 9 10 11 12 13 14

• • Circuit view on top of P.C.B.

REMOTE SENSOR

FL601 IC601 IC602 R613 R608 C601 C602 CN607 CN606 CN605 CN604 (SKIP) (SKIP) (SEARCH (SEARCH (OPEN /CLOSE) S610 S609 S608 S607 S601

B SERVO P.C.B.

FEG TEG VR106 VR101 VR105 VR104 VR102 VR103 VR501 IC102 IC101 IC103 IC104 IC105 IC501 IC201 IC202 IC106 Q181 Q182 Q141 Q142 Q201 Q203 Q101 Q161 Q162 CN101 CN102 CN103 DI81 DI82 TJ101 R117 DC SPINDOL MOTOR

C MOTOR/ SWITCH P.C.B.

S101 S102 CN701 LOADING MOTOR

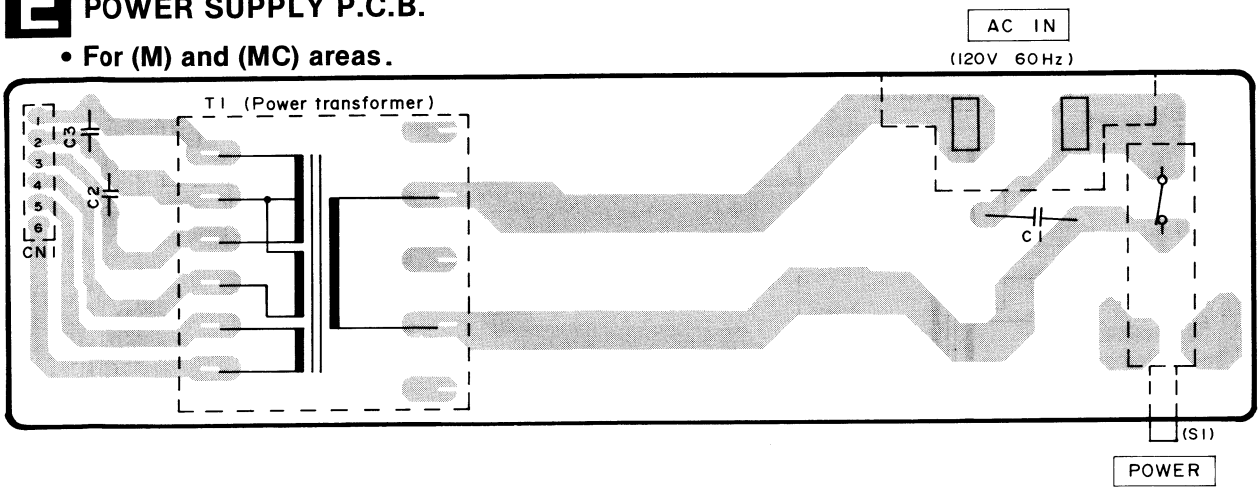
F HEADPHONES AMP P.C.B.

Q881 Q882 IC871 CN871 PHONES J871 PHONES LEVEL

15 16 17 18 19

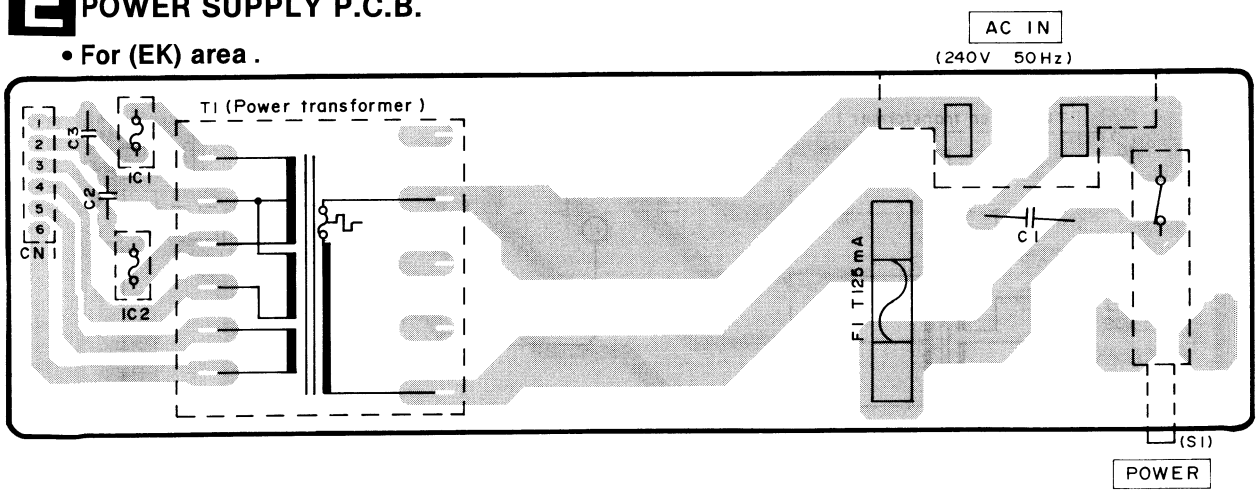
E POWER SUPPLY P.C.B.

• For (M) and (MC) areas.



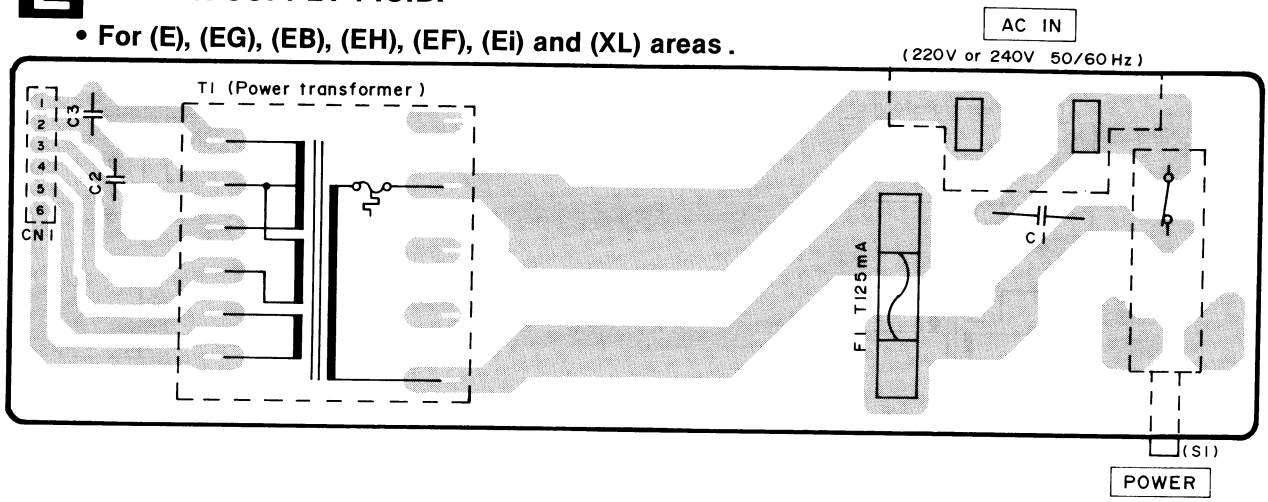
E POWER SUPPLY P.C.B.

• For (EK) area.



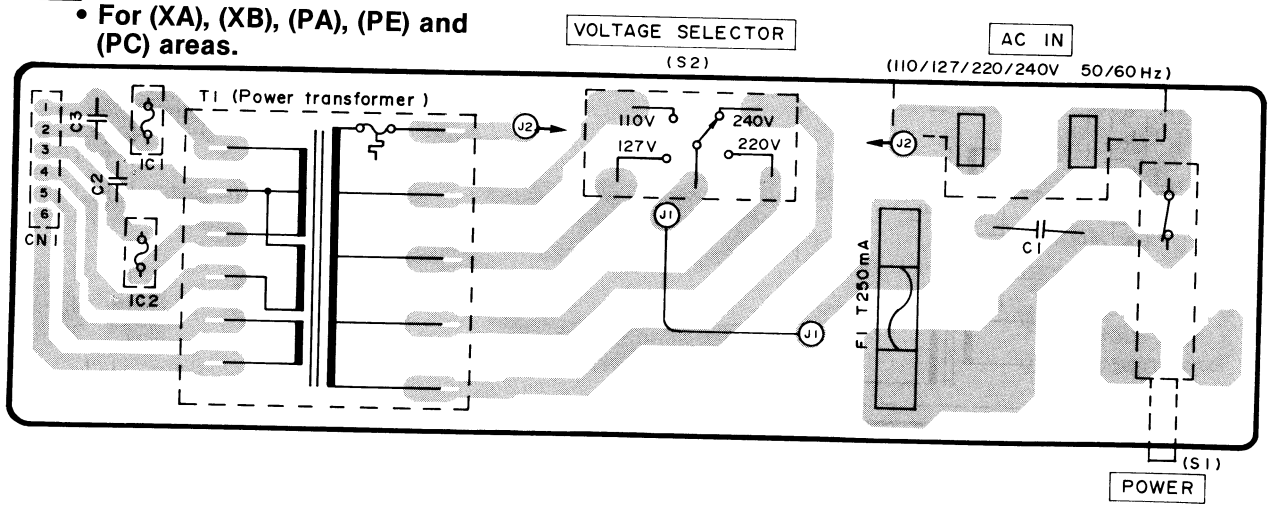
E POWER SUPPLY P.C.B.

• For (E), (EG), (EB), (EH), (EF), (Ei) and (XL) areas.

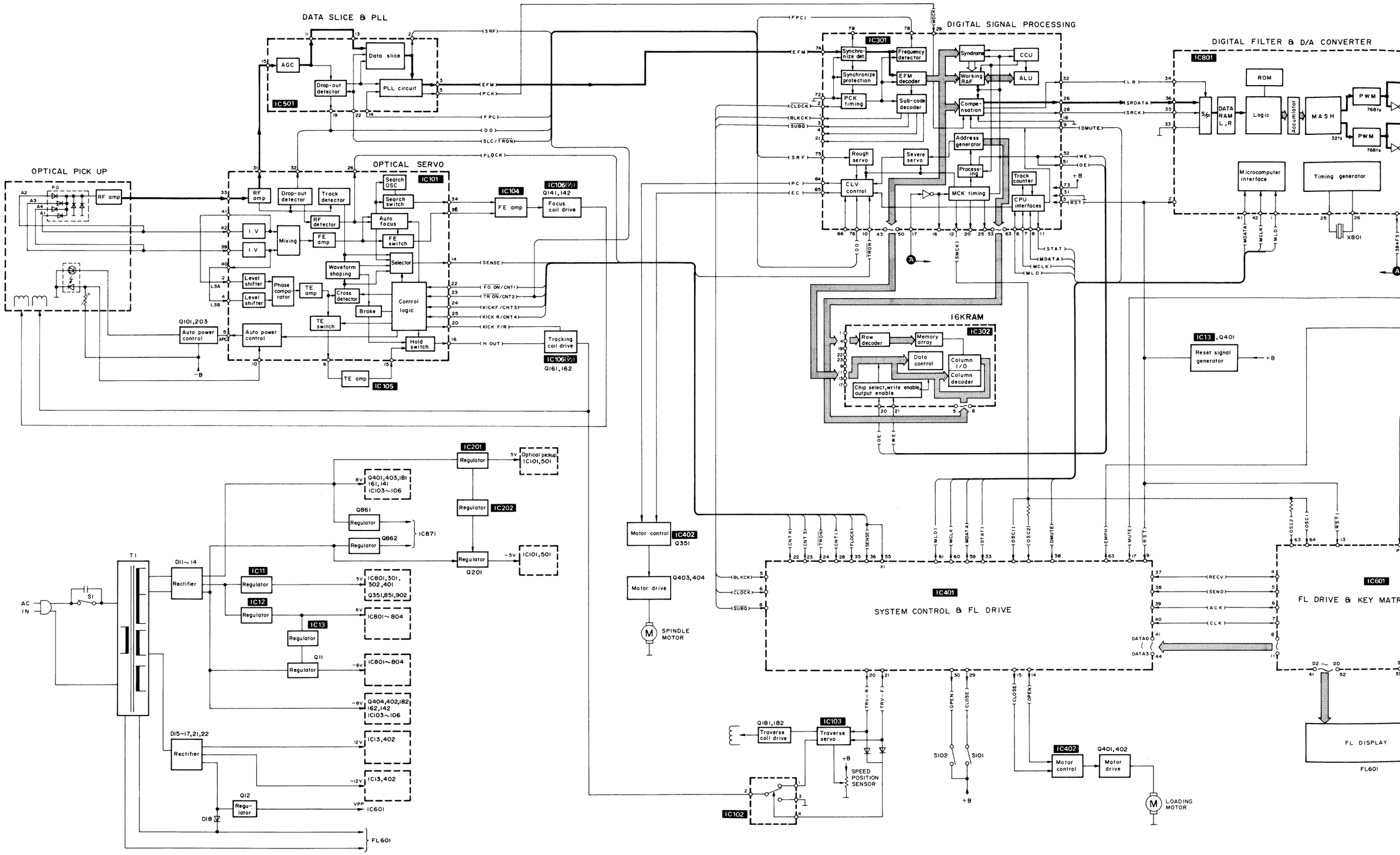


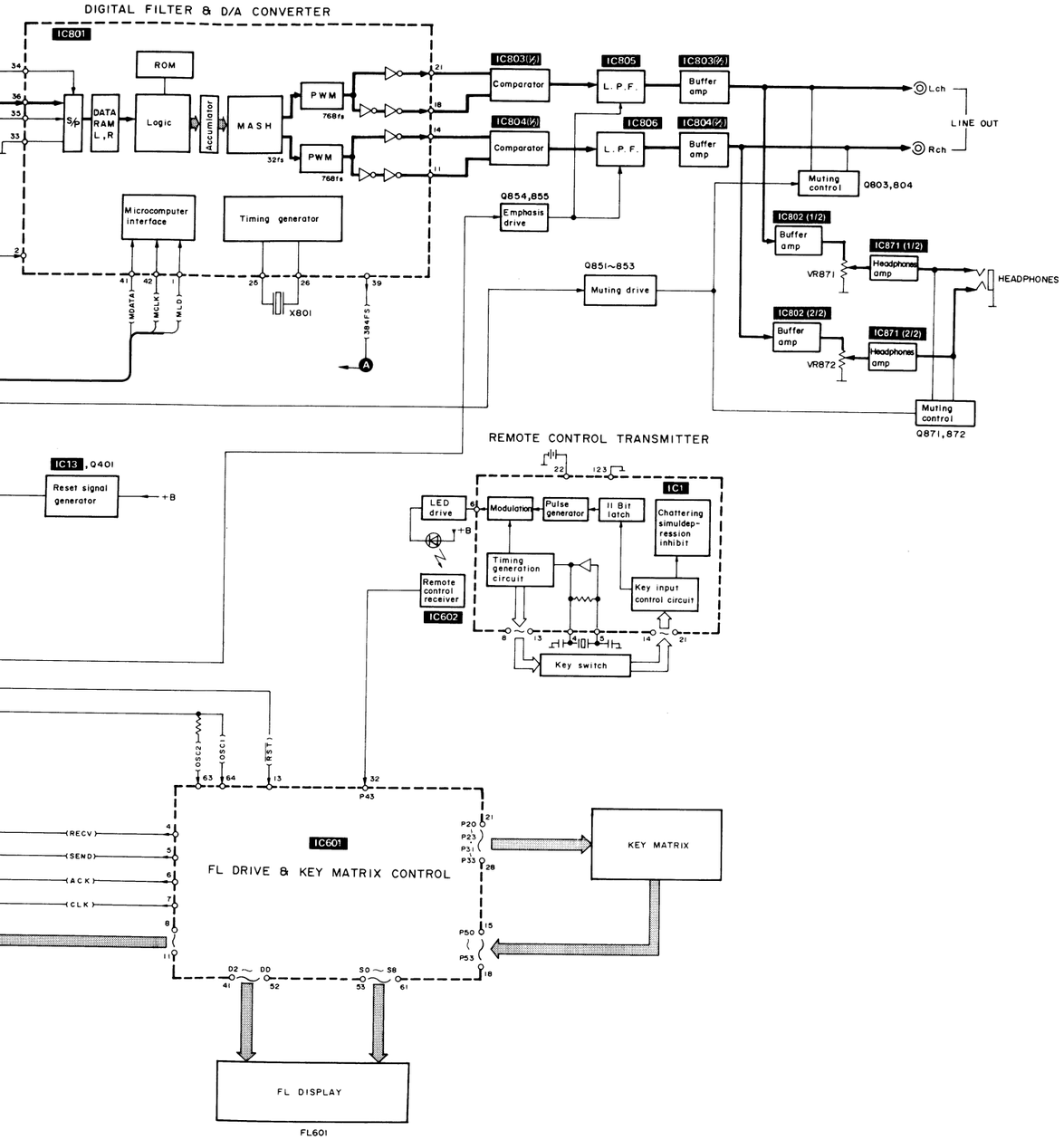
E POWER SUPPLY P.C.B.

• For (XA), (XB), (PA), (PE) and (PC) areas.



■ BLOCK DIAGRAM

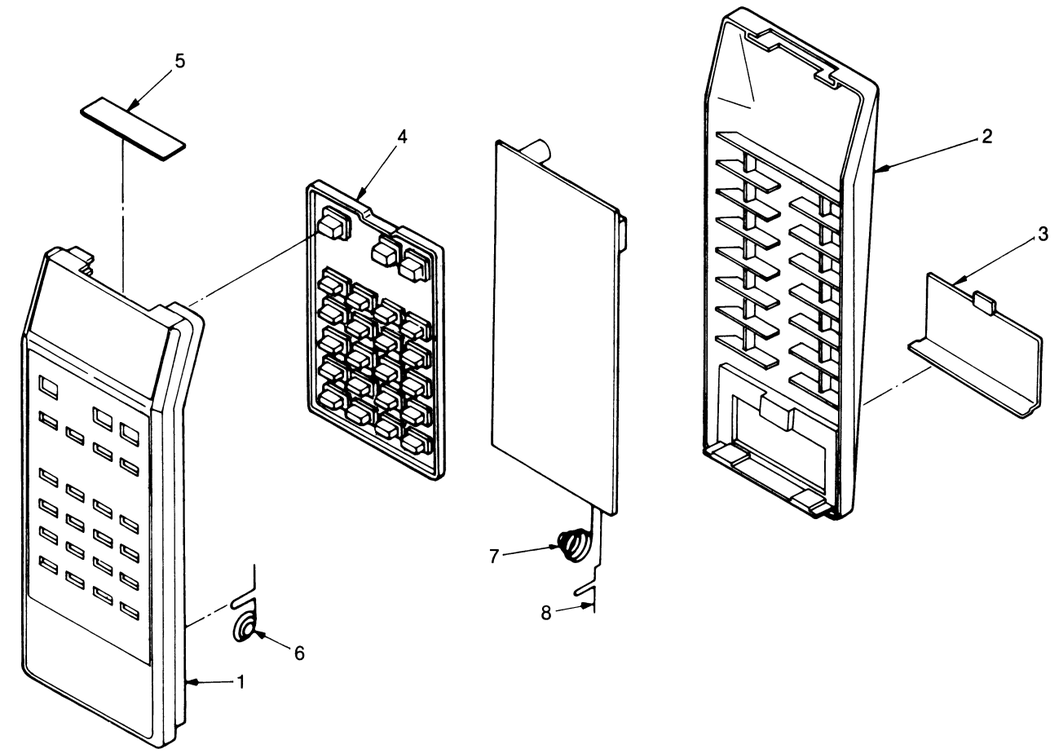




Note)

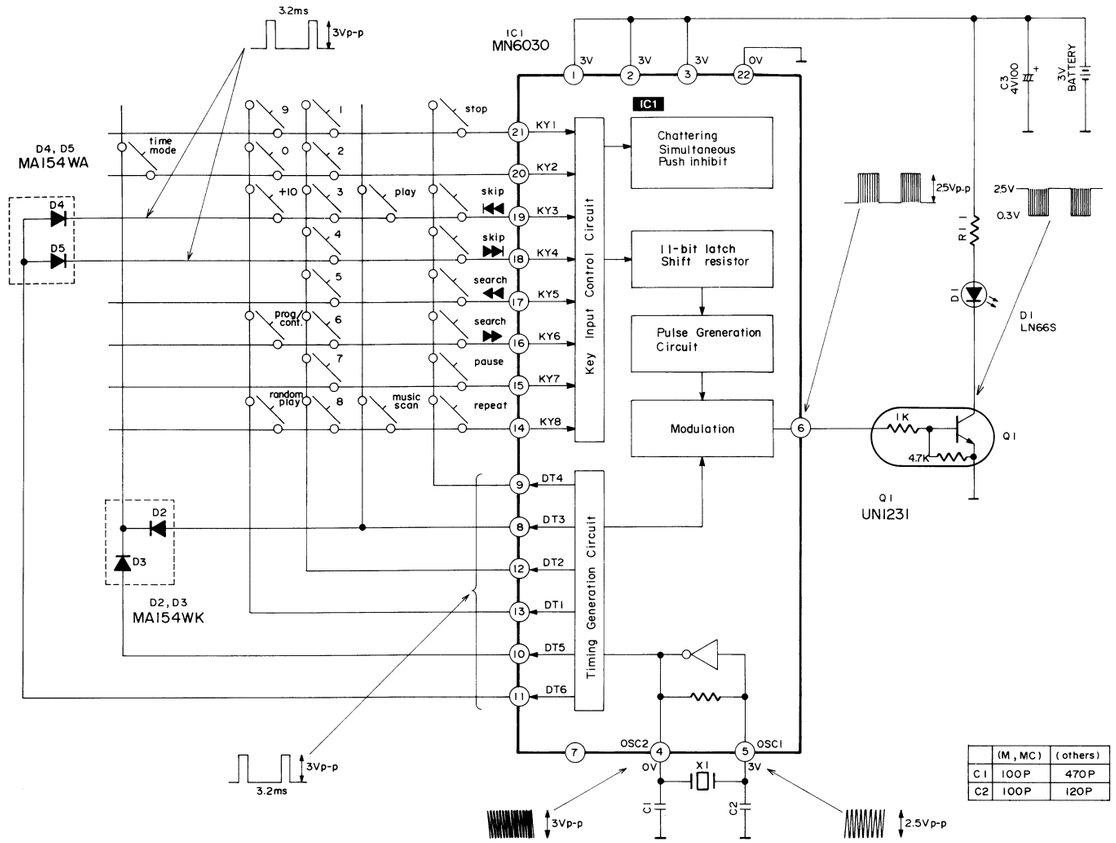
• ⟶ Audio signal

■ REMOTE-CONTROL UNIT PARTS



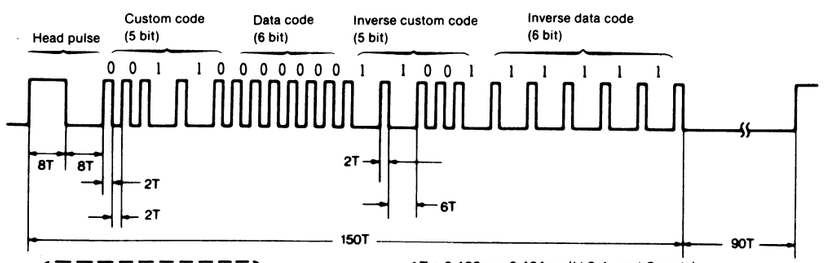
Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1 (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	MN6030B	I.C, REMOTE SIGNAL
IC1 (M, MC)	MN6030CA	I.C, REMOTE SIGNAL
TRANSISTORS		
Q1	UN1231	TRANSISTOR
DIODES		
D1	LN66-S	L.E.D
D2	MA154WK	DIODE
D3	MA154WK	DIODE
D4	MA154WK	DIODE
D5	MA154WK	DIODE
OSCILLATOR		
X1 (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	CSB420PB1	OSCILLATOR
X1 (M, MC)	CSB455EB1	OSCILLATOR
RESISTORS		
R1	ERDS2TJ1R0	CARBON, 1Ω, 1/4W
CAPACITORS		
C1 (M, MC)	ECKD1H101KB	CERAMIC, 100PF, 50V
C1 (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	ECKD1H471KB	CERAMIC, 470PF, 50V
C2 (M, MC)	ECKD1H101KB	CERAMIC, 100PF, 50V
C2 (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	ECKD1H121KB	CERAMIC, 120PF, 50V
C3	ECEA0GK101	ELECTROLYTIC, 100μF, 4V
MECHANISM PARTS		
1 Ⓚ (M, MC)	UR64VCS548	UPPER CABINET
1 Ⓚ (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	UR64VCS550	UPPER CABINET
1 Ⓢ	UR64VCS582	UPPER CABINET
2 Ⓚ	UR64CS803A	LOWER CABINET
2 Ⓢ	UR64CS803B	LOWER CABINET
3 Ⓚ	UR64EC804	BATTERY COVER
3 Ⓢ	UR64EC804A	BATTERY COVER
4	UR64CT811C	BUTTON
5	UR52SB327	PLATE
6	UR64TD374	BATTERY TERMINAL(COMMON)
7	UR64TD813	BATTERY TERMINAL(-)
8	UR64TD812	BATTERY TERMINAL(+)
REMOTE CONTROL ASS'Y		
RC1 Ⓚ (M, MC)	EUR64786	REMOTE CONT.(REF TO NOTE)
RC1 Ⓚ (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	EUR64787	REMOTE CONT.(REF TO NOTE)
RC1 Ⓢ	EUR64788	REMOTE CONT.(REF TO NOTE)

■ SCHEMATIC DIAGRAM OF REMOTE-CONTROL TRANSMITTER

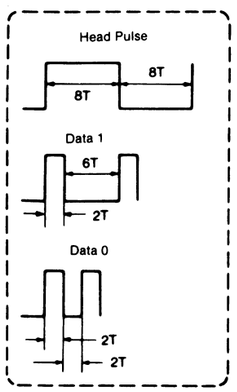


	(M, MC)	(others)
C1	100P	470P
C2	100P	120P

• Key number description and data code



*1T = 0.420ms~0.424ms (U.S.A. and Canada)
1T = 0.454ms~0.460ms (Europe and Others)



Function	Data Code
stop	000000
skip ⏮	000010
skip ⏭	000011
search ◀◀	000100
search ▶▶	000101
pause	000110
repeat	000111
play	001010

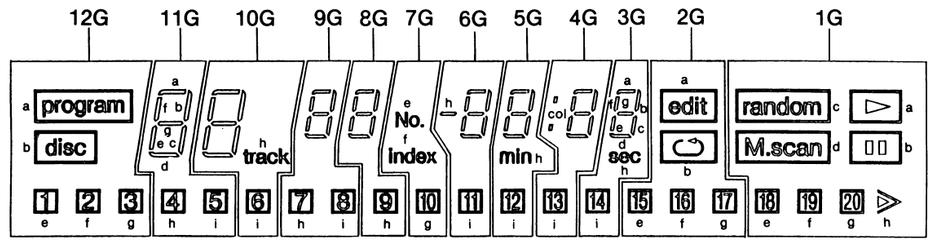
Function	Data Code
music scan	001111
1	010000
2	010001
3	010010
4	010011
5	010100
6	010101
7	010110

Function	Data Code
8	010111
9	011000
0	011001
+10	011010
program/ continue	011101
random play	011111
time mode	101001

*Custom Code: 01100

■ INTERNAL CONNECTION OF FL

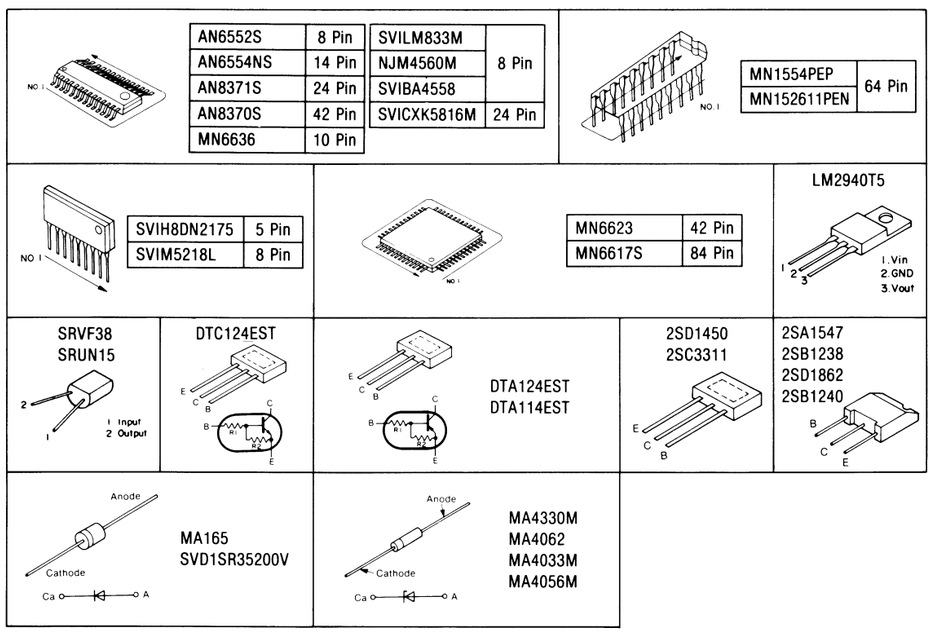
• Grid connection diagram



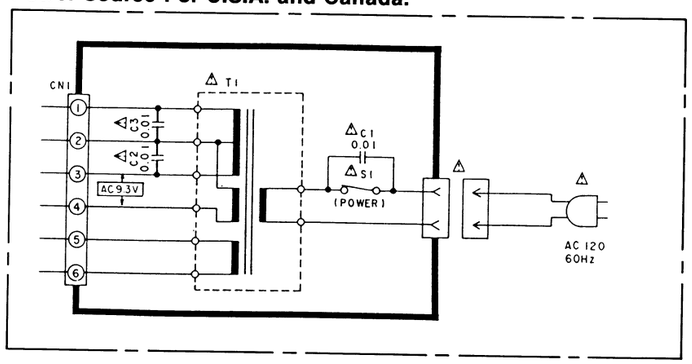
• Anode connection table

	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	program	a	a	a	a	–	a	a	a	a	edit	▶
b	disc	b	b	b	b	–	b	b	b	b	↻	❚❚
c	–	c	c	c	c	–	c	c	c	c	–	random
d	–	d	d	d	d	–	d	d	d	d	–	M.scan
e	1	e	e	e	e	NO.	e	e	e	e	15	18
f	2	f	f	f	f	index	f	f	f	f	16	19
g	3	g	g	g	g	10	g	g	g	g	17	20
h	–	4	track	7	9	–	—	min	col	sec	–	▶
i	–	5	6	8	–	–	11	12	13	14	–	–

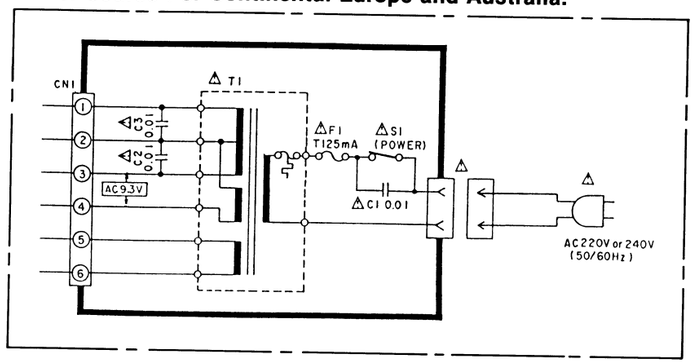
■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



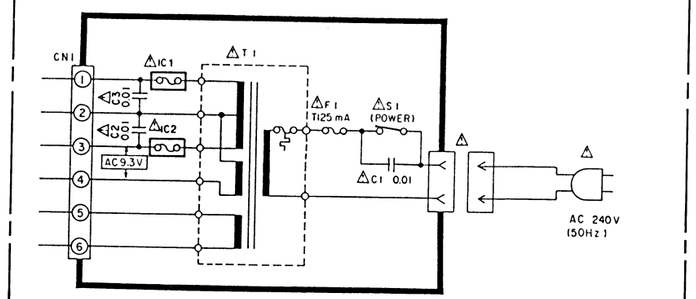
Power Source For U.S.A. and Canada.



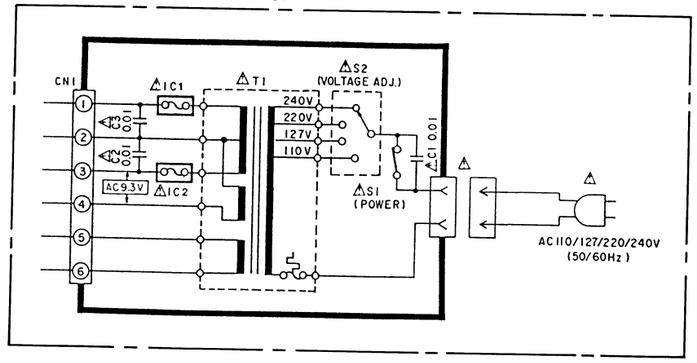
Power Source For Continental Europe and Australia.

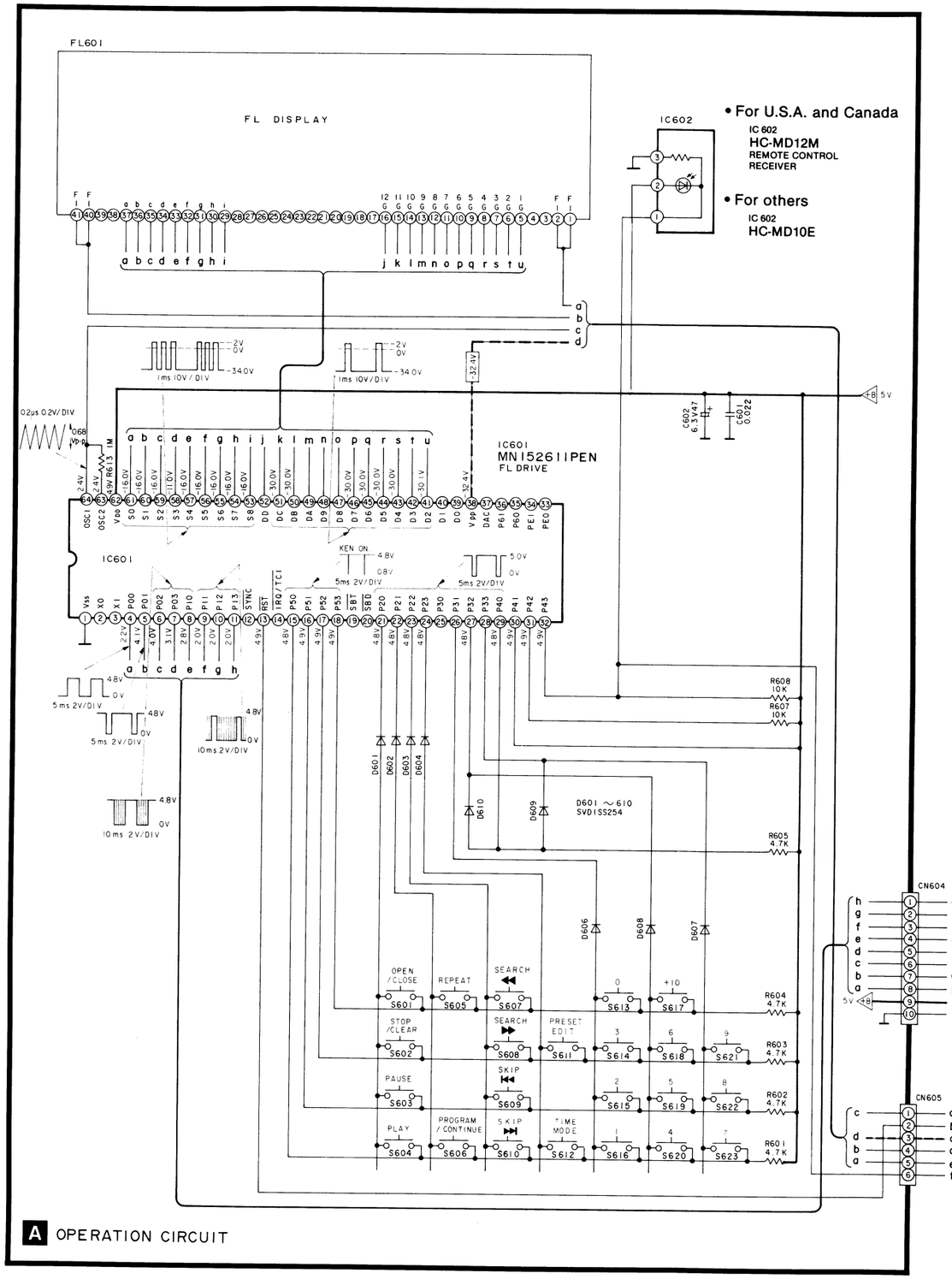


Power Source For (EK) area.



Power Source For Others.





A OPERATION CIRCUIT

OPTICAL PICKUP

OPTICAL PICK UP

B SERVO CIRCUIT

C MOTOR/ SWITCH CIRCUIT

D D/A CONVERTER/AUDIO CIRCUIT

SPEED POSITION SENSOR

IC101 AN8370S OPTICAL SERVO

IC102 MN6636 SWITCHING

IC103 BA10324FTI TRAVERSE SERVO

IC104,106 SV1BA4558FTI FOCUS COIL/ TRACKING COIL DRIVE

IC105 SV1BA4558FTI FOCUS ERROR AMP

IC201 LM2940T5 REGULATOR

IC202 SV1BA4558FTI REGULATOR

IC302 CXK5816M 16K RAM

IC401 MN1554PE

IC402 BA4558FTI MOTOR DRIVE

IC501 AN8371S PLL/DATA SLICE

Q101 2SA1547 A.P.C

Q141,161 2SD1862 FOCUS COIL/ TRACKING COIL DRIVE

Q142,162 2SB1240 FOCUS TRACKING COIL DRIVE

Q181 2SD1862 TRAVERSE COIL DRIVE

Q182 2SB1240 TRAVERSE COIL DRIVE

Q201 2SD1862 REGULATOR

Q203 2SD1862 A.P.C

Q301 DTC124EST SWITCHING

Q351 DTA124EST SWITCHING

Q401 2SD1862 MOTOR DRIVE

Q402 2SB1240 MOTOR DRIVE

Q403 2SD1862 MOTOR DRIVE

Q404 2SB1240 MOTOR DRIVE

Q405 DTC124EST RESET

Tracking offset adj.

Focus offset adj.

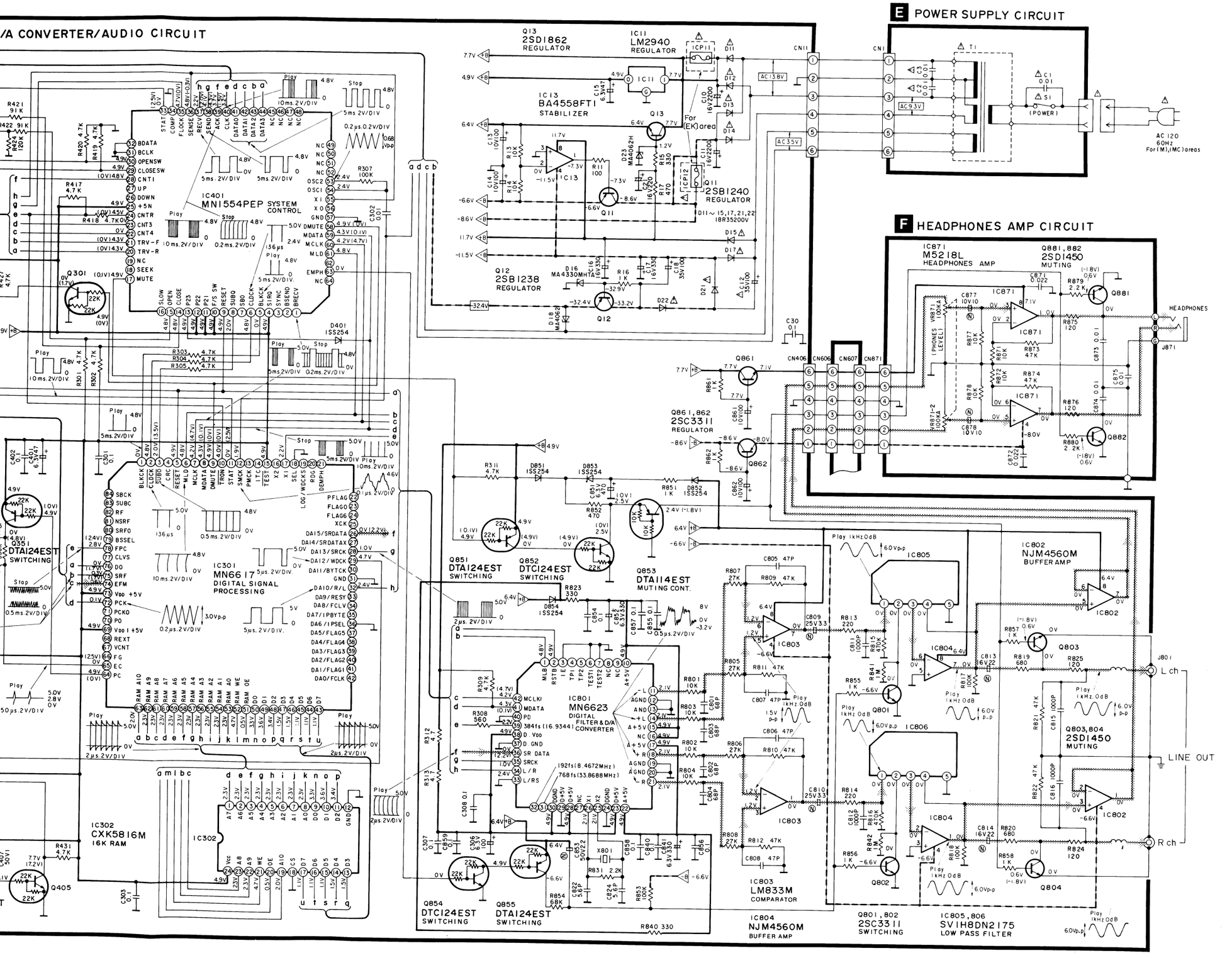
Tracking balance adj.

Best eye adj.

Tracking gain adj.

Focus gain adj.

PLL adj.



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with development of new technology.)

Notes:

- **S1** : Power switch in "**on**" position.
- **S2** : Voltage selector switch. (For [EK], [XA], [XB], [PA], [PE] and [PC] only.)
- **S101** : Disc holder open/close detection switch.
- **S102** : Disc holder open/close detection switch.
- **S601** : Open/close switch.
- **S602** : Stop switch.
- **S603** : Pause switch.
- **S604** : Play switch.
- **S605** : Repeat switch.
- **S606** : Program switch.
- **S607** : Backward search switch.
- **S608** : Forward search switch.
- **S609** : Backward skip switch.
- **S610** : Forward skip switch.
- **S611** : Preset edit play switch.
- **S612** : Time-mode select switch.
- **S613~623**: Numeric switch.
  [S613: 0, S614: 3, S615: 2, S616: 1, S617: +10, S618: 6, S619: 5, S620: 4, S621: 9, S622: 8, S623: 7]
- The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
  * The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.
- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- —□—/--□--- : Positive voltage lines and negative voltage lines.
  ⋯⋯ : Audio signal lines.

Caution !

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.

■ REPLACEMENT PARTS LIST (Mechanical parts)

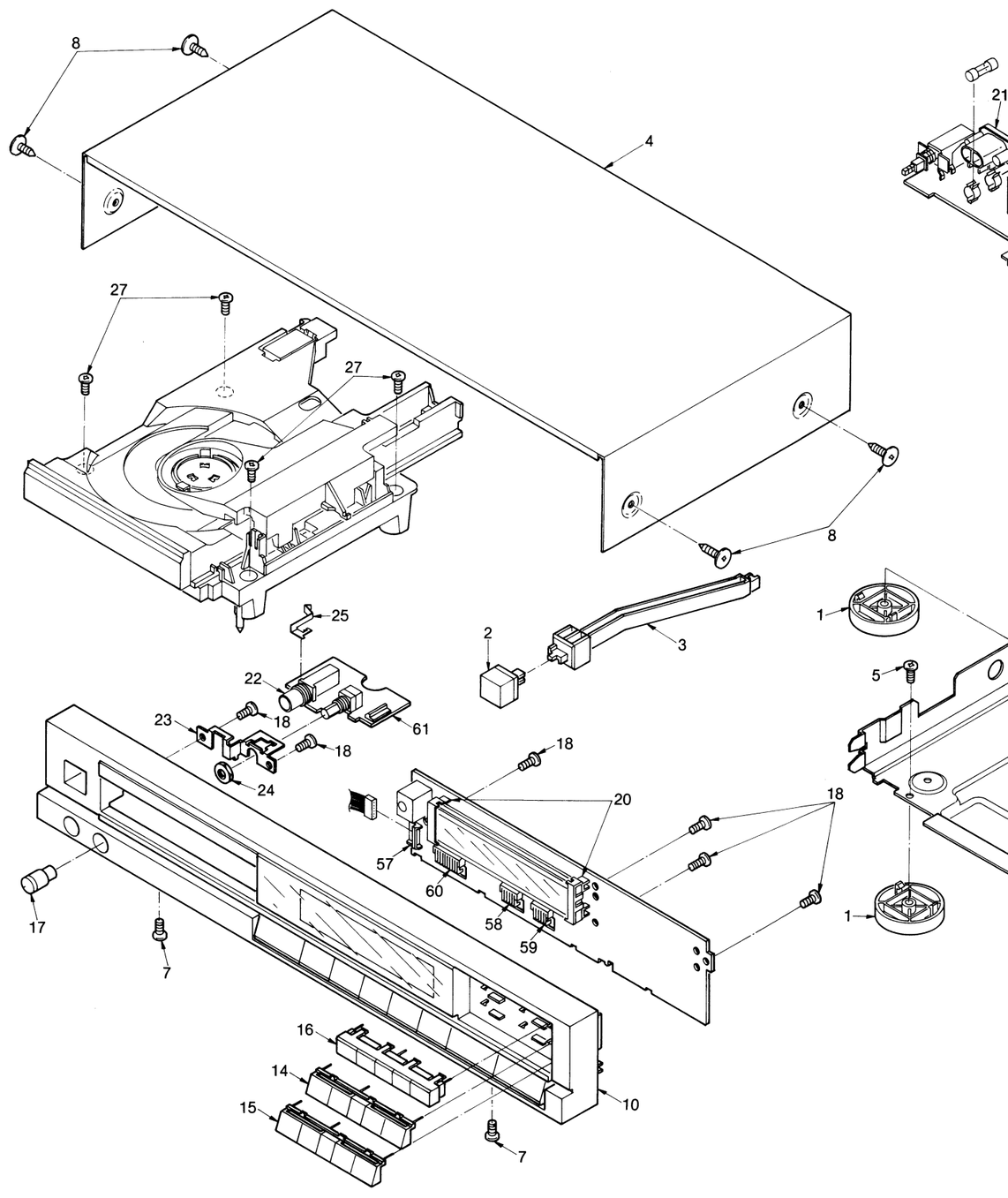
Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.
* Ⓜ Indicates parts that the supplied by **MESA.**
* "Ⓢ" mark parts are used for silver type only.
* "Ⓚ" mark parts are used for black type only.
Parts other than "Ⓢ" and "Ⓚ" marked are used for both silver and black types.

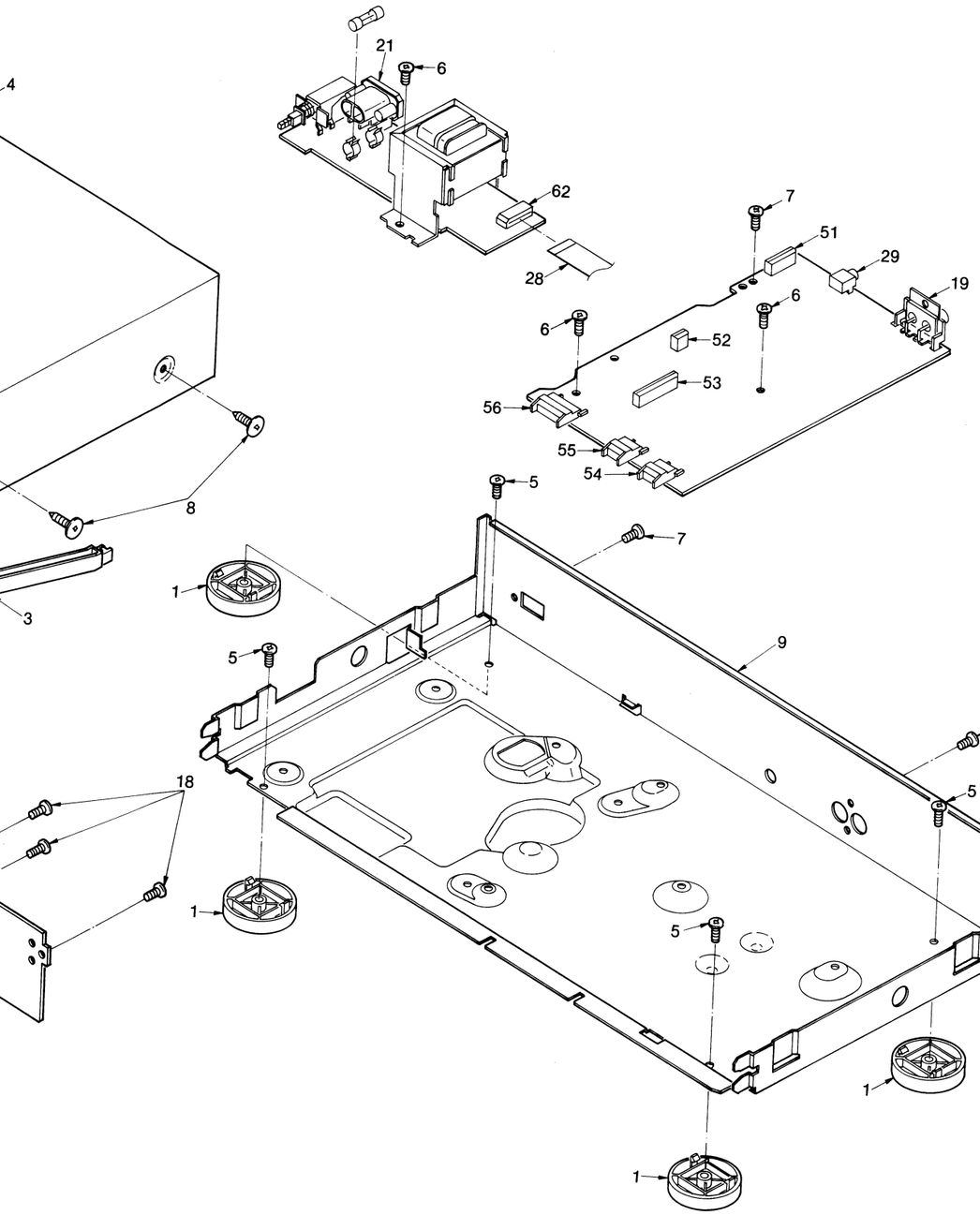
Ref. No.		Part No.	Description
CABINET AND CHASSIS			
1		SKLD7	INSULATOR
2	Ⓚ	SBC666-5	BUTTON, POWER
2	Ⓢ	SBC666	BUTTON, POWER
3		SUBD8-3	ROD
4	Ⓚ	SKCD40KZ	CABINET
4	Ⓢ	SKCD40SY	CABINET
5		XTB3+8G	SCREW
6		XTB3+8J	SCREW
7		XTB3+8JFZ	SCREW
8	Ⓚ	SNE2129-1	SCREW
8	Ⓢ	SNE2129	SCREW
9 (E)		SGPLP250-KE	CHASSIS
9 (EB, EH, EF) (EI)		SGPLP250-KEB	CHASSIS
9 (EG)		SGPLP250-KEG	CHASSIS
9 (EK)		SGPLP250-KEK	CHASSIS
9 (M, MC)		SGPLP250-KM	CHASSIS
9 (PA, PE, PC)		SGPLP250-KPA	CHASSIS
9 (XA)		SGPLP250-KXA	CHASSIS
9 (XB)		SGPLP250-KXB	CHASSIS
9 (XL)		SGPLP250-KXL	CHASSIS
10	Ⓚ	SGYLP250-KM	FRONT PANEL
10	Ⓢ	SGYLP250-SE	FRONT PANEL
14	Ⓚ	SBCD5090ZK0A	BUTTON, PROGRAM
14	Ⓢ	SBCD5090MA0A	BUTTON, PROGRAM
15	Ⓚ	SBCD5100ZK0A	BUTTON, PROGRAM
15	Ⓢ	SBCD5100MA0A	BUTTON, PROGRAM
16	Ⓚ	SBCD5100ZK0B	BUTTON, REPEAT
16	Ⓢ	SBCD5100MA0B	BUTTON, REPEAT
17	Ⓚ	SBN1161-2	KNOB, HEADPHONES LEVEL
17	Ⓢ	SBN1161-3	KNOB, HEADPHONES LEVEL
18		XTB3+8G	SCREW
19		SJFD4	OUTPUT TERMINAL(PHONO)
20		SMND19	DISPLAY HOLDER
21 (M, MC, XL)	⚠	SJSD16	AC INLET
21 (E, EK, EG, EB) (EH, EF, EI) (XA, XB, PA) (PE, PC)	⚠	SJS9236	AC INLET
22		SRDJHLJ15401	HEADPHONES JACK
23		SMND13-1	BRACKET
24		XNS7	NUT
25		SUSD82	GND,TERMINAL
27		XTB3+8F	SCREW
28		SIKD150061	FLAT CABLE
CONNECTORS			
51		SJT30640LX-V	CONNECTOR(CN11)
52		SJT30543-V	CONNECTOR(CN401)
53		SJSD2221	CONNECTOR(CN402)
54		SJS50680WL	CONNECTOR(CN406)
55		SJS50680WL	CONNECTOR(CN405)
56		SJS51080WL	CONNECTOR(CN404)
57		EMCS0650ZL	CONNECTOR(CN607)
58		SJT30647WL	CONNECTOR(CN605)
59		SJT30647WL	CONNECTOR(CN606)
60		SJT31047WL	CONNECTOR(CN604)
61		EMCS0650ZL	CONNECTOR(CN871)
62		SJT30640LX-V	CONNECTOR(CN1)

Ref. No.		Part No.	Description
LOADING MECHANICAL			
101	Ⓚ	SGXD3300ZK0A	ORNAMENT
101	Ⓢ	SGXS3300MA0A	ORNAMENT
102		SISD22-1	TRAVERSE BASE
103		SD0D28-1E	TURNTABLE
103-1		XXE26D5	SCREW
104		SD0D29-2	RING
106		SRQA010N04	SPRING
107		S0RD37	ROLLER
108		S0RD38-E	COIL
109		SUXD123-1	GUIDE SHAFT
110	⚠	SQAD70A	OPTICAL PICKUP
111		EWSLP150-KM	COIL HOLDER
112		SNSD35	SCREW
113		SHGD148	STOPPER
114		S0YD21-E	YOKE (A)
115		S0YD22	YOKE (B)
116		SHRD177-1	LOCK UNIT
117		SHWD33	WASHER
118		SHWD34	WASHER
119		SNSD31	SCREW
120		XTV2+5G	SCREW
121		XYN2+C8	SCREW
122		XYN26+J6	SCREW
123		SHGD153-1	CUSHION RUBBER
124		SUSD136-1	SPRING
125		SUSD137-1	SPRING
126		SNSD33	SCREW
127		SIWLP150-KM	LOADING BASE
128		SUSD145-1	SPRING
129		SUWD112	GUIDE SHAFT HOLDER
130		SDRD13	ROLLER
131		SDGD58	MAIN GEAR
132		SDGD59-1	PULLEY GEAR
133		SIRD94-E	LOADING MOTOR
134		XTB3+10G	SCREW
135		SMBD7	BELT
136		SIRD101-1	LOADING BASE SHAFT
137		SFUMZ15R61	WASHER
138		SDRD14	ROLLER
139		XTB3+8G	SCREW
140		SIRLP990-KM	DISC HOLDER
141		SIRD99	TRAY BASE
142		SIRD40-2	RACK GEAR
143		SIRD96	LOCK LEVER
144		SFUMZ15R61	WASHER
145		SIRD98-1	DISC TRAY
146		SUSD83	SPRING
147		SFXGQ06N01	SCREW
148		SIWD105	BRACKET
149		SJGDRF310T-2	SPINDLE MOTOR
150		SIRD28	HOLDER
151		SIRD42-2	CLAMPER
152		S0MD4	MAGNET
153		S0YD2	YOKE
154		SIKD150051	FLAT CABLE
155		SIKD150221-1	FLAT CABLE
156		SHRD150	ROLLER HOLDER
157		SJSD1722	CONNECTOR(CN101)
158		SJSD2222	CONNECTOR(CN103)
159		SJT30543-V	CONNECTOR
160		SDRD12	ROLLER

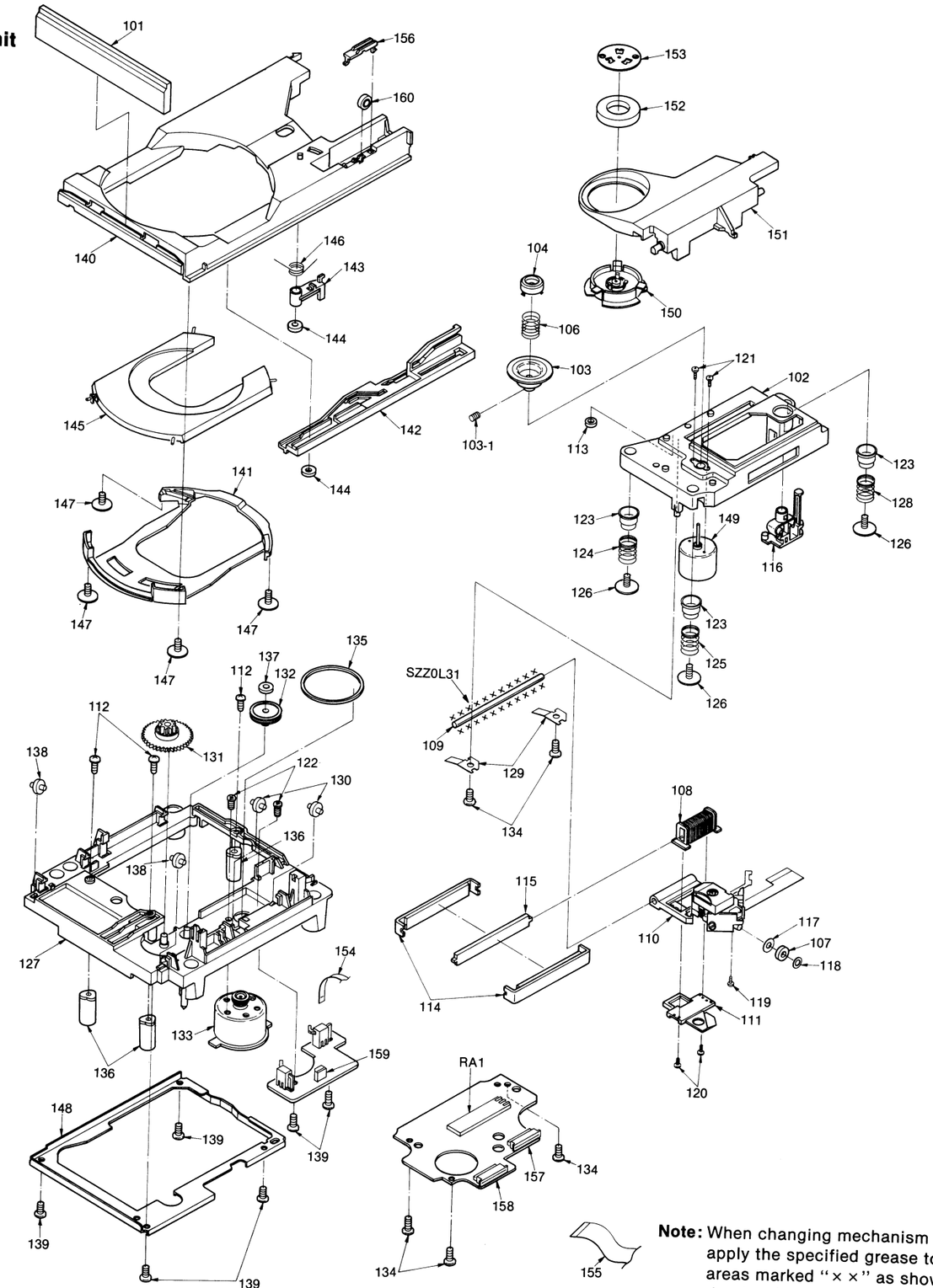
■ EXPLODED VIEWS

• Cabinet and chassis parts





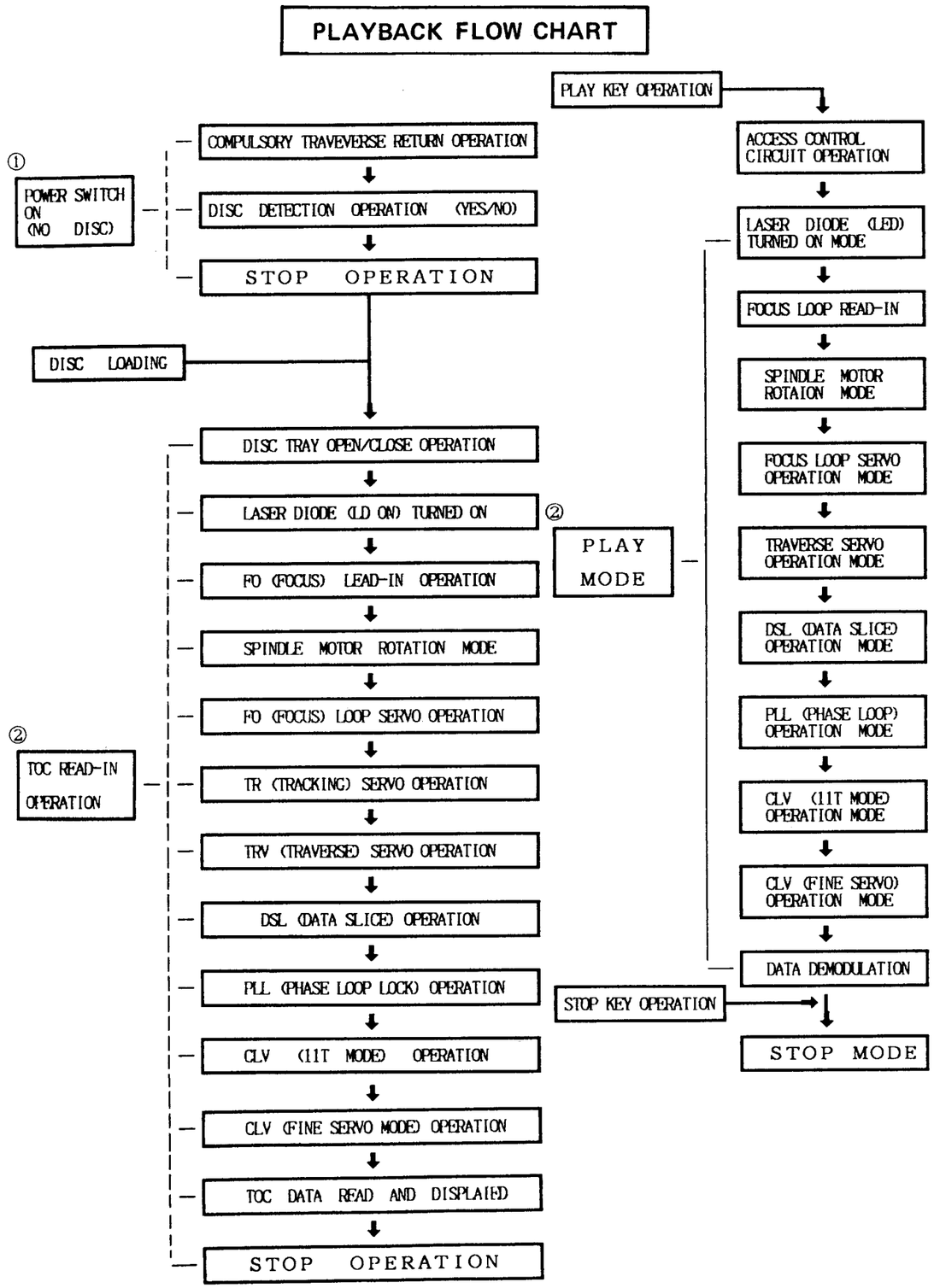
• Loading unit



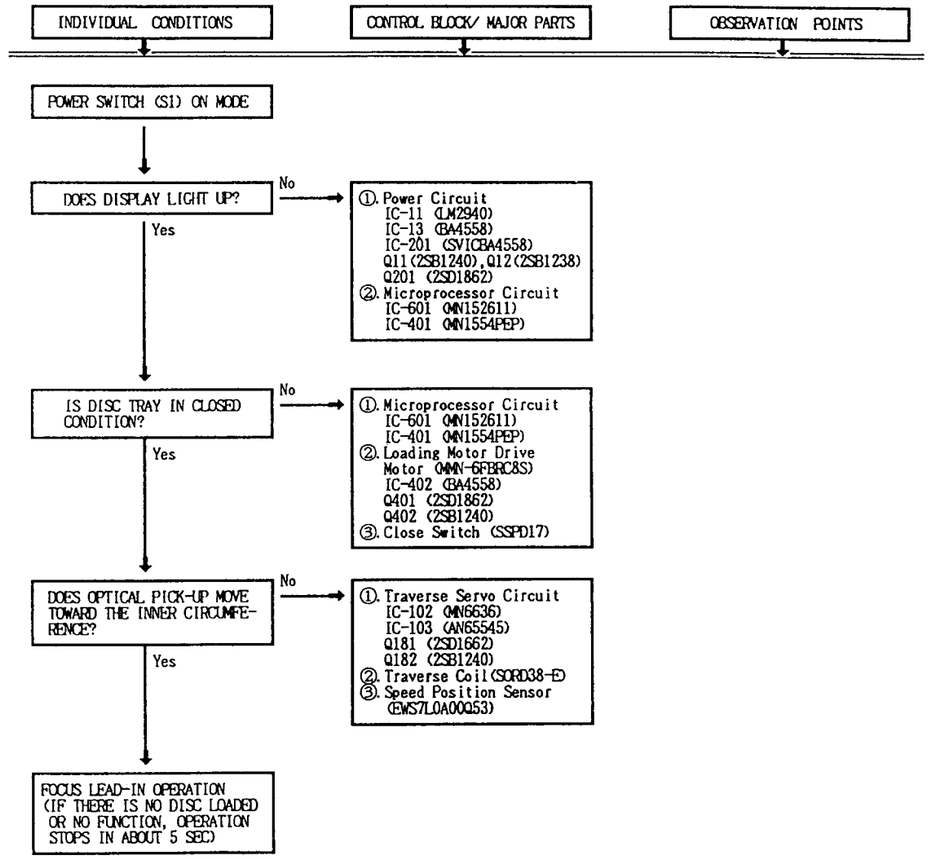
Note: When changing mechanism parts, apply the specified grease to the areas marked "× ×" as shown in the drawing.

■TROUBLESHOOTING GUIDE

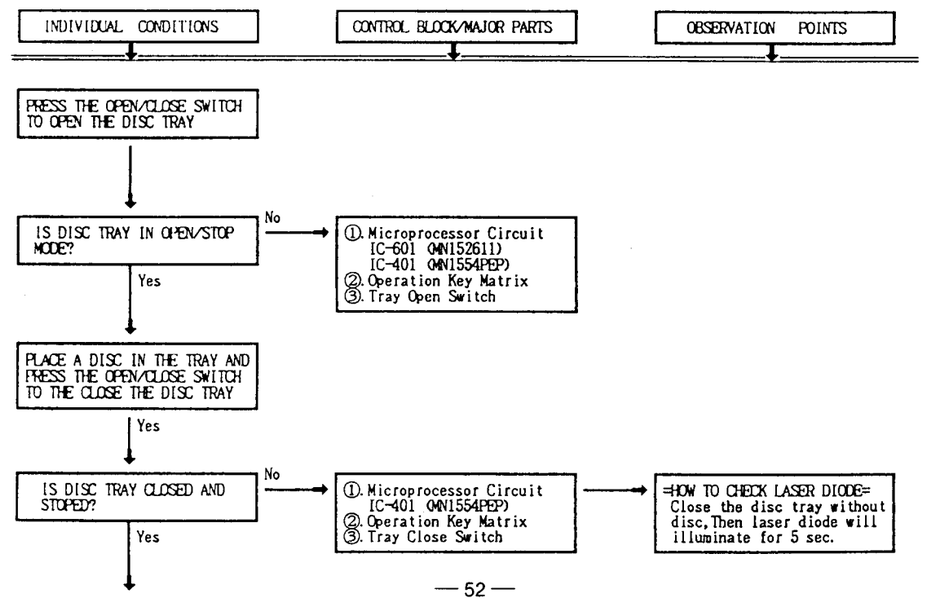
PLAYBACK FLOW CHART



① POWER S/W ON MODE OPERATION



② TOC READ OPERATION ~ PLAY OPERATION


INDIVIDUAL CONDITIONS
CONTROL BLOCK/MAJOR PARTS
OBSERVATION POINTS
PRESS THE OPEN/CLOSE SWITCH TO OPEN THE DISC TRAY
IS DISC TRAY IN OPEN/STOP MODE?
No
①. Microprocessor Circuit
IC-601 (MN152611)
IC-401 (MN1554PEP)
②. Operation Key Matrix
③. Tray Open Switch
Yes
PLACE A DISC IN THE TRAY AND PRESS THE OPEN/CLOSE SWITCH TO THE CLOSE THE DISC TRAY
Yes
IS DISC TRAY CLOSED AND STOPED?
No
①. Microprocessor Circuit
IC-401 (MN1554PEP)
②. Operation Key Matrix
③. Tray Close Switch
=HOW TO CHECK LASER DIODE=
Close the disc tray without disc, Then laser diode will illuminate for 5 sec.
Yes

D

ORDER NO. AD8809244A0
A6

Service Manual

COMPACT disc DIGITAL AUDIO

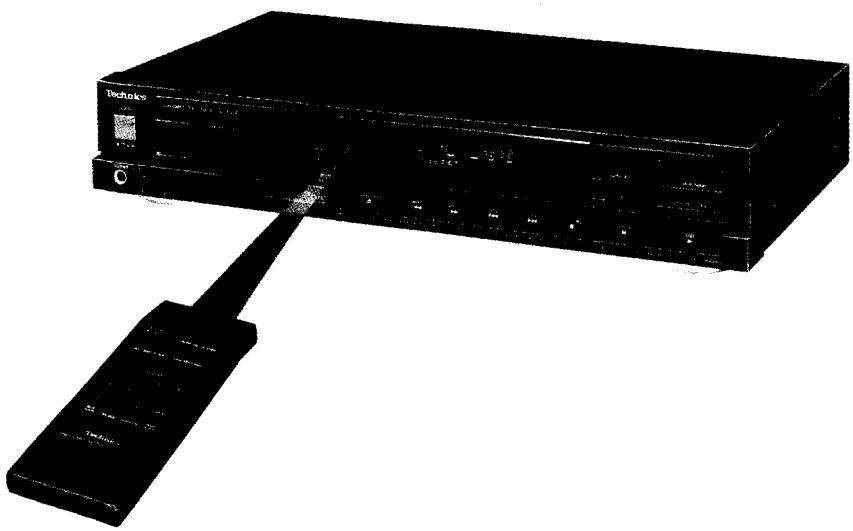
DIGITAL

Compact Disc Player

SL-P230

Color

(K)...Black Type
(S)...Silver Type



Area

Color	Area
(K)	(M).....U.S.A.
(K)	(MC).....Canada.
(K) (S)	(E).....Continental Europe.
(K) (S)	(EK).....United Kingdom.
(K) (S)	(XL).....Australia.
(K) (S)	(EG).....F.R. Germany.
(K) (S)	(EB).....Belgium.
(K) (S)	(EH).....Holland.
(K) (S)	(EF).....France.
(K) (S)	(Ei).....Italy.
(K)	(XA).....Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	(XB).....Saudi Arabia.
(K)	(PA).....Far East PX.
(K)	(PE).....European Military.
(K)	(PC).....European Audio Club.

Note: Please dispose of the service manual for Model No. SL-P230 (Order No. HAD8803101A0) and replace it with this service manual.

1. **This model is a derivative model of Model No. SL-P250. When you repair this model, please refer to the service manual (Order No. HAD8803055C0) and supplement manual (Order No. AD8809240S0) for the SL-P250.**
2. **This service manual contains some differences to the service manual for the SL-P250.**

Notes: ★ Mentioned in this service manual is the differences from Model No. SL-P250 for each area.
★ Please note the following major defference when servicing.
• This product is not provided with the numeric switches on the operation P.C.B.

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CHANGES

■ REPLACEMENT PARTS LIST

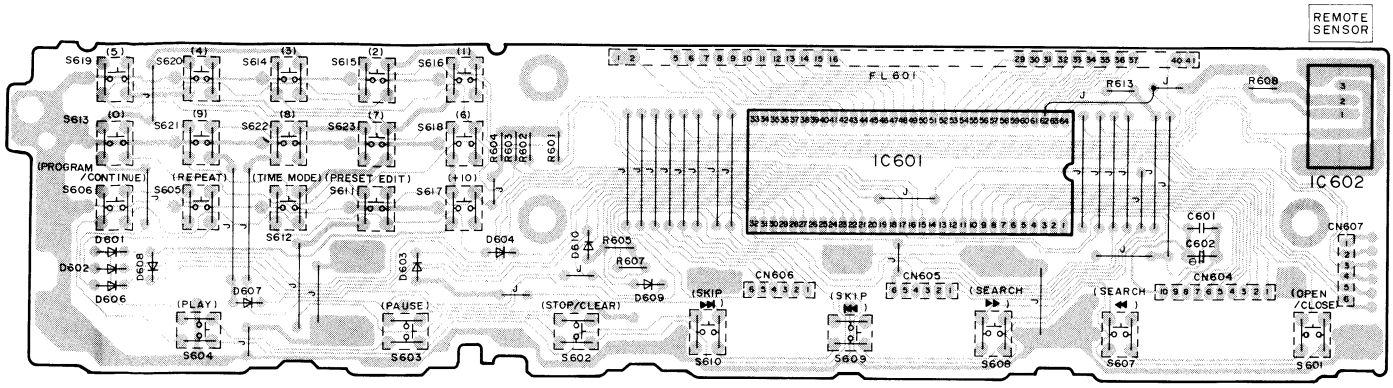
Notes: ★ Mentioned in this parts list are only those parts different from Model No. SL-P250 for each destination, other parts are the same as for Model No. SL-P250 for each destination.
★ "Ⓢ" mark parts are used for silver type only.
★ "Ⓚ" mark parts are used for black type only.
★ Parts other than "Ⓢ" and "Ⓚ" marked are used for both silver and black types.

Ref. No.	Change of Part No. SL-P250 → SL-P230		Part Name & Description	Remarks
SWITCHES				
S613~S623	EVQQS405K	——	Switch, Numeric	Deletion
CABINET AND CHASSIS				
9 [E]	SGPLP250-KE	**SGPLP230-KE**	Chassis	Change
9 [EB, EH, EF, Ei]	SGPLP250-KEB	**SGPLP230-KEB**	Chassis	Change
9 [EG]	SGPLP250-KEG	**SGPLP230-KEG**	Chassis	Change
9 [EK]	SGPLP250-KEK	**SGPLP230-KEK**	Chassis	Change
9 [M, MC]	SGPLP250-KM	**SGPLP230-KM**	Chassis	Change
9 [PA, PE, PC]	SGPLP250-KPA	**SGPLP230-KPA**	Chassis	Change
9 [XA]	SGPLP250-KXA	**SGPLP230-KXA**	Chassis	Change
9 [XB]	SGPLP250-KXB	**SGPLP230-KXB**	Chassis	Change
9 [XL]	SGPLP250-KXL	**SGPLP230-KXL**	Chassis	Change
10 Ⓚ	SGYLP250-KM	**SGYLP230-KM**	Front Panel	Change
10 Ⓢ	SGYLP250-SE	**SGYLP230-SE**	Front Panel	Change
14 Ⓚ	SBCD5090ZK0A	**SBCD5070ZK0B**	Button, Time Mode	Change
14 Ⓢ	SBCD5090MA0A	**SBCD5070MA0B**	Button, Time Mode	Change
15 Ⓚ	SBCD5100ZK0A	**SBCD5070ZK0A**	Button, Program	Change
15 Ⓢ	SBCD5100MA0A	**SBCD5070MA0A**	Button, Program	Change
16 Ⓚ	SBCD5100ZK0B	**SGXD3320ZK0A**	Button, Ornament	Change
16 Ⓢ	SBCD5100MA0B	**SGXD3320MA0A**	Button, Ornament	Change
PACKING				
P1 Ⓚ [M, E, EG, EB, EH, Ei, EK, XL, XA, XB, PA, PE, PC]	SPND290	**SPND287**	Carton Box	Change
P1 [MC] Ⓚ	SPND291	**SPND288**	Carton Box	Change
P1 [EF] Ⓚ	SPND292	**SPND289**	Carton Box	Change
P1 Ⓢ [E, EG, EB, EH, Ei, EK, XL, XB, XA]	SPND303	**SPND301**	Carton Box	Change
P1 [EF] Ⓢ	SPND304	**SPND302**	Carton Box	Change
ACCESSORIES				
A1 [E, EB, EH]	SQXLP250-KE	**SQXLP230-KE**	Instruction Manual	Change
A1 [MC]	SQXLP250-KMC	**SQXLP230-KMC**	Instruction Manual	Change
A1 [PA, PE, PC]	SQXLP250-KPA	**SQXLP230-KPA**	Instruction Manual	Change
A1 [XB]	SQXLP250-KXB	**SQXLP230-KXB**	Instruction Manual	Change
A1 [M]	SQX54598	**SQX54591**	Instruction Manual	Change
A1 [XL, XA, EF]	SQX54600	**SQX54593**	Instruction Manual	Change
A1 [EK]	SQX54602	**SQX54595**	Instruction Manual	Change
A1 [EG]	SQX54603	**SQX54596**	Instruction Manual	Change
A1 [Ei]	SQX54604	**SQX54597**	Instruction Manual	Change

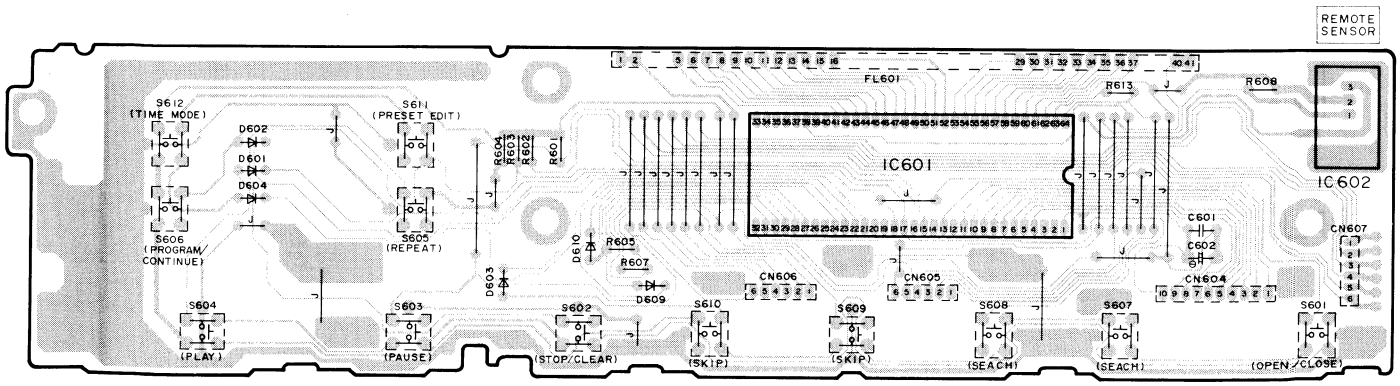
■ PRINTED CIRCUIT BOARD

A OPERATION P.C.B.

(SL-P250)



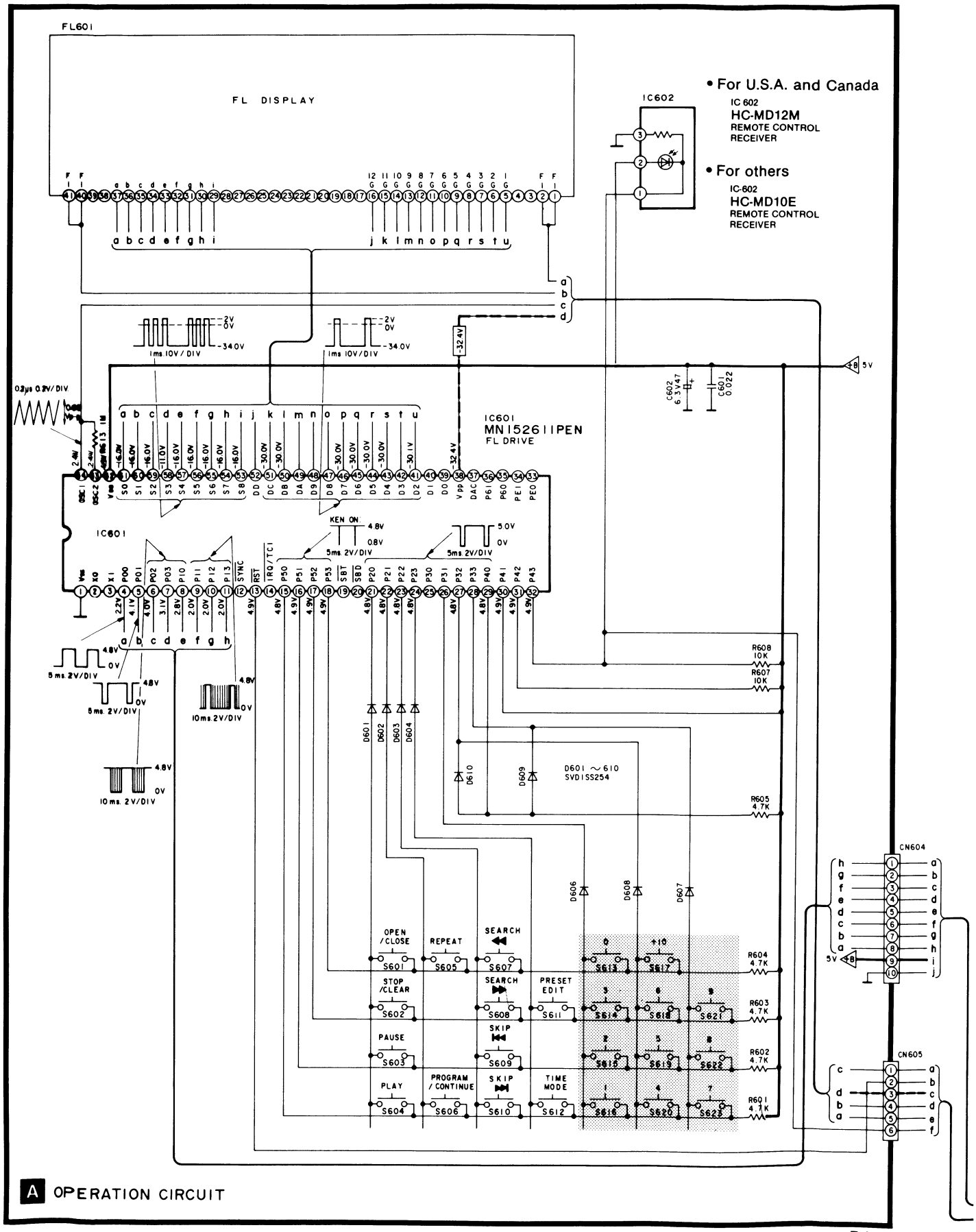
(SL-P230)



■ SCHEMATIC DIAGRAM

• OPERATION CIRCUIT

Note: This product is not provided with the numeric switches in the shaded area.



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